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ECONOMIC AND SOCIAL IMPACT ANALYSIS OF AN UPLAND DEVELOPMENT PROJECT IN NUEVA ECIJA, PHILIPPINES

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I. INTRODUCTION

Agro-forestation is a system of land management whereby forest and agricultural products are produced on appropriate and suitable areas simultaneoulsy or sequentially for the social, economic and ecological benefit of the community (PCARRD 1979). This approach to forest occupancy management seeks to stabilize shifting cultivators by managing them in forest lands, in contrast to resettling them in lowland, agricultural areas.

As an improvement over the traditional farming technology used in upand areas, agro-forestation seeks to achieve simultaneously the following general objectives:

(1) to create harmony between natural resource conservation and production;
(2) to lessen the gap between food, water, and wood supply and demand;
(3) to implement a land use scheme that is based on ecological, sociological, and demographic considerations; and
(4) to prevent further forest destruction.

Agro-forestation is therefore primarily a resource conservation

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strategy which is premised on the multiple use of the uplands. As such, it is expected to produce the following outputs:

(1) increased forested area and wood production;
(2) increased production of agricultural crops and livestock;
(3) improved socioeconomic conditions of the beneficiaries;
(4) stabilization of forest occupancy;
(5) improved environment; and
(6) knowledge of the acceptable, feasible and sustainable agro-forestry cropping systems.

By their very nature, agro-forestry projects have numerous potentials for producing impacts on the various development areas of concern.

The study focuses on agro-forestation projects which involve shifting cultivators. Specifically, it illustrates methods of analyzing the progress and impact of three pilot agro-forestation development projects (AFDP) in the country through the use primarily of secondary information.

Peculiarities in the AFDPs and AFDP Project Evaluation

The AFDPs analyzed in this study were being implemented on *a pilot* (and *small-scale*) basis and were relatively *recent.* Agro-forestation, however, is a *time-intensive* activity which means that the impact of such projects can be observed only after a considerable span of time has elapsed. Given this, the present analysis was limited to: (1) monitoring the *early* impacts on the project cooperators and, possibly, their immediate neighbors; (2) focusing on the *more direct* impacts; and (3) looking into nonproject specific factors which are also relevant to the AFDPs. The analytical framework discussed below, however, allows for the conduct of longer-lived impact studies. This is done to highlight imperative areas of concern which forestry development planners normally fail to consider, as well as to suggest data-gathering thrusts for impact analyses in the future.

An important feature of the country's agro-forestation is that it is still *experimental* and being continuously modified to suit the environmental and social needs of the dynamic populace and the environment where it is being implemented. Thus, alongside the actual conduct of agro-forestry activities are attempts to evaluate

the social, cultural, economic, and environmental *feasibility* of the pilot projects by the project implementors themselves. These imply that *changes within the project implementation bodies* also need to be considered in the impact evaluation. This is particularly important when the implementing unit is also trying out nontraditional methods of project management, such as the multi-disciplinary approach of the Upland Hydroecology program.

In addition to such project-specific peculiarities, "external" factors significantly influence the success or failure of agro-forestation. Upland development through agro-forestation seeks to solve the problems of poverty, production, and conservation altogether. However, these problems in the uplands are caused by many factors: migration into uplands due to lack of lowlands for agricultural cultivation, increasing population, activities of illegal loggers, and overgrazing ranchers, among others. Thus, the success of agro-forestry projects is also linked to the viability of projects and/or policies which address these factors.

Migration into the agro-forestation site by noncooperators is a case in point. The granting of land by the government for use by agro-forestry cooperators and initial increases in the latter's income due to improved production and marketing methods would certainly attract others. In the event that kaingin-making by nonproject cooperators occurs, the initial success of agro-forestation's impact on production, income and environmental stabilization will eventually be negated by these in-migrants' activities. This indicates that the external factors (external to the project management) also need to be considered.

Moreover, the pilot agro-forestry projects being studied are found either in watershed areas or are proximate to such areas, which have been given priority for forest renewal due to their crucial role in water and energy sources and in preserving environmental stability. Thus, other development projects which are being conducted in the neighboring areas are: (a) large-scale reforestation, and (b) construction of dams and supporting infrastructure for irrigation services and power generation. Complementarities among the various watershed development activities would therefore affect their respective successes. In the same vein, effective regulation of forest-based activities such as logging, grazing, mining, and the like, also needs to monitored.

Given all these considerations, the study also sought to under-

stand and document the following:

(1) the processes through which pilot AFDPs' implementors seek to achieve their objectives;
(2) the mechanisms through which pilot AFDPs may be expected to produce an impact on the important development areas of concern;
(3) the interrelationships among various upland development projects;
(4) data gathering systems relevant to research on upland farmers; and
(5) policies affecting upland development.

II. CONCEPTUAL FRAMEWORK AND METHODOLOGY

Generally, the progress and impact of agro-forestation on the areas of concern may be traced through: (a) modifications in the sociocultural-demographic-economic and institutional characteristics of the upland farmers; (b) changes in their use of inputs to production; (c) changes in their production and productivity; (d) linkages with development projects and other communities; and (e) environmental changes due to the new mix of vegetative cover in the uplands.

The conduct of agro-forestation entails the reorientation of the cooperators towards practicing conservation-oriented patterns of cultivation. Thus, the immediate impact of agro-forestation is to change the attitudes and perceptions of the cultivators towards production and the environment.

Moreover, agro-forestation conducted in upland areas where communication and transportation facilities are markedly lacking, where relatively few development projects have been vigorously pursued, and where communities are generally distant from more developed (lowland) areas, usually necessitates the building of organizations through which agro-forestry activities are introduced (Cuevas 1979). The organization therefore serves as the venue through which the government enlists the upland farmer to participate in the development process.

Changes in perceptions and organization building, however, would produce positive effects on the behavior of the cooperators as viewed through their practice of suggested agro-forestry cropping

patterns only as long as the necessary inputs are available. Such inputs would include (a) the planting materials, such as seedlings, fertilizers, implements; (b) labor; (c) water; and (d) land. In short land, labor, time and capital would be crucial to the progress of agro-forestation.

Two time frames for impact assessment are discussed: the first pertains to the direct and short-run impacts of AFDP projects which may be validated within the first few years of project implementation; the second deals with impact analysis for longer-lived studies. While the present study focuses on the first set of impacts and project progress, it also presents data which represent baseline information for operationalizing the indicators developed for analyzing long-run impacts.

Hypotheses on Impacts of Agro-forestation

a. AFDP Impact on the Environment

Since a major effort in the initial stage of agro-forestation is to reorient the farmer-cooperators towards conservation concepts, training them in the skills needed to conduct agrisilvicultural practices is a major AFDP activity. Farmers are trained on the whys and the hows of evolving a cropping system which is ecologically and economically sustainable over time. The initial agro-forestry effects therefore are changing attitudes towards conservation in general, and specific environmental issues such as: maintenance of soil fertility, effects of slash-and-burn techniques, the hydrological cycle, and others. Some concrete manifestations of changing perceptions on the ecosystem might be: the discontinuance of kaingin-making, the building of firebreaks, and actual planting of tree crops along with agricultural crops. Such manifestations would reflect the progress of the AFDP towards the achievement of its objectives.

The building of bench terraces and the establishment of contour terraces would have immediate impacts on the environment since they provide structures which arrest soil erosion. They also allow better regulation of water flows and the application of improved rice technologies.

In the long run, the reestablishment of appropriate vegetative cover on open, unproductive areas through agro-forestation is expected to restore the following services especially provided by the

forests to the environment: (a) restoration and maintenance of soil fertility, (b) control of soil erosion, (c) enhancement of the ground's ability to absorb water, and (d) completion of the hydroecological cycle and the food chain.

These services, in turn, yield the following results: (a) control of surface runoff; (b) minimized sedimentation of streams and reservoirs, thereby assisting the maintenance of irrigation and other water systems; (c) stabilitization of the flow of water during the dry and rainy seasons and minimization of the occurrence of extreme droughts and flash flooding; and (d) control of pests and plant diseases.

b. Impact on Participation/Women in Development

Agro-forestation needs to be implemented through the formulation of strong farmers' organizations. This is emerging as a necessary condition for a sustained effort at agrisilvicultural practices (Mindajao 1978; Cuevas 1979). More specifically, the setting up of organizations may be necessary for the following: (a) the conduct of activities with cooperation and mutual support; (b) the preservation of peace and order, and (c) as a prerequisite for establishing linkages with government agencies for the latter's provision of inputs, facilities, and the like. The effectiveness of organizations in carrying out a project which seeks to benefit the poor members of upland communities should thus be analyzed.

With organization building and a shift to more labor-intensive farm techniques, the allocation of household time for farm, marketing and organization needs will increase. This implies more involvement of women and children in farm-based activities, the distribution of the produce, and decision-making. Collective arrangements in labor supply, for instance, are manifested in the strong practice of the *bayanihan* system. This is expected to become noticeable in the short run, when increased incomes are not likely to be realized yet, when paid labor is not yet feasible, and when surplus family labor exists. In the long run, when higher cash incomes are generated, children will be spending more time in school, women will be able to set up cottage industries with available capital, and wage labor may be observed in the farms.

Changes in farm technology would also affect women's participation. Vergara (1985), for instance, noted that harvesting by

Manobos is generally done by women, while the men stand by on guard against tribal enemies.

An indicator of the progress of agro-forestation should be the continued participation of the farmer. A successful AFDP would imply low drop-out rates among initial farmer-cooperators, and the expansion of the coverage of the project to neighboring communities.

The success of agro-forestry is expected to positively affect political stability in the uplands in the long run. A crucial factor to consider, however, is the ability of government institutions to cope with the demands of agro-foresting communities which have strong organizations and have large mass bases. Actions of institutions which are not responsive to the rational demands of such communities would only create tension in the uplands and alienate such areas from the government. This is all the more important when the communities already feel that they have been treated unfairly, such as those in Pantabangan which have earlier been dislocated in favor of development projects which benefit the lowlanders. The extent and nature of interaction between the upland communities and representatives of government agencies in the uplands would thus critically determine the outcome of agro-forestation itself, as well as other developments in the uplands. Unequal access to or participation in the project benefits, however, breeds conflict. This seems to be a common occurrence especially where Christians and cultural minority groups are concerned.

The demands of strong organized agro-foresting groups on existing institutions may be complicated further, since agro-forestation seeks to solve problems of poverty, production, and conservation altogether. The failure to address any of these may result in short-lived projects, and more difficulties will beset the implementation of upland development projects in the future.

c. Impact on Production/Productivity

The direct influence of agro-forestation on production and productivity would cover both agricultural and timber production. In the short run, the agricultural production of *kaingero*-cooperators would increase due to the cultivation of agricultural crops employing better techniques, the encouragement of animal raising, and the use of improved inputs, such as soil and fertilizer (from ipil-ipil leaves

or animal manure). Better marketing links would encourage the upland farmer to diversify his agricultural crop production. In the long run, the raising of forest crops like fruit trees, ipil-ipil, and other fast-growing species would increase wood output. And, should land tenure be assured for a considerable length of time, the growing of hardwood trees would be encouraged.

Immediate impacts on production may be seen by looking into the mix of crops being planted and the animals being raised, and the use of inputs. The mix of crops of upland farmers – if it is to address the problems of poverty and lack of linkages with formal markets and lowlands – must help the farmer achieve a certain degree of self-reliance in basic commodities and market orientation. In the long run, farm surpluses and the desire to accumulate more capital will lead to more market participation by the uplanders. The development of adequate and fair marketing arrangements is therefore important to generate cash income.

Again, it is needless to stress that increases in production and productivity will be experienced only when the inputs to production are available. Thus, availability of control over production inputs is crucial to the choice of the right cropping pattern. Access to land, an important factor of production, is one question which agro-forestry project cooperators and implementors are still tackling. An improved land stewardship policy may be seen in the recent consideration of 25-year leases for forest occupants, though its operationalization is still being studied. Earlier, forest occupancy permits were revised to cover two years instead of one year; however, its effectivity remains to be balanced against the time intensiveness of agro-forestation.

Furthermore, agro-forestation would indirectly influence production and productivity through:

(a) improved environmental conditions, allowing adequate water supply for irrigation, and maintaining lowland soil fertility;
(b) the prevention of flash flooding and minimization of the extent of flooding;
(c) the prevention of further encroachment on growing secondary forests, allowing them to mature into timber producing trees;

(d) the use of compost fertilizer from ipil-ipil leaves sold in the market that would augment the use of organic fertilizer by farmers.

d. Agro-Forestry and Income

In addition to increased agricultural and wood crop production, agro-forestry affects the income level of the participating shifting cultivator through: (a) increased hired labor income; and (b) increased income from nonfarm activities, such as from cottage industries, orchid selling, etc. A marked increase in the income of shifting cultivator-project cooperators may then be expected to diminish the wide income gap between upland and lowland farmers.

Some balance between the desire for conservation and the need for increasing incomes may be achieved with the right choice of crops. Care must be taken to avoid overproduction of particular commodities which could result in depressed prices for both the upland and lowland farmers. This is where impact projection is necessary: it must take into account future supply and demand for crops, expected productivities (given some allowances for risk due to typhoons and the like) and expected price control/support measures.

While these impacts may be considered direct, the impact on the income of nonparticipating farmers and communities tends to be indirect. For nonshifting cultivators living nearby, income levels may also rise as forestry activities — orchid-gathering, fuelwood gathering, and the like — increase because of the availability of more forests. For communities nearby, incomes are indirectly increased due to: (a) decreases in expenditures on property damage because of flash flooding or drought, and (b) the enhancement of other economic activities through higher agricultural and timber outputs.

e. Agro-Forestry and Labor Use

The impact of agro-forestry on labor use is both direct and indirect. Since most agro-forestry schemes aim to stabilize labor use throughout the year, farm activities would also be designed for this purpose. In addition, the labor-intensive building of bench terraces, contour terraces, roads and trails would result in a higher demand

for labor. Land clearing without burning would also require more labor than otherwise. The hiring of kaingeros in reforestation activities would similarly result in increased employment. In the long run, indirect employment effects would arise as more wood-based industries are set up and expanded.

f. Impact on Other Areas of Concern

Because agro-forestation is more labor-intensive (kaingin making saves on labor by burning), the cooperators are more exposed to the adverse work conditions in the farm. Thus, it may cause negative effects on *health* in the short run. However, such impacts may be negated by the positive impacts on nutrition (and health) brought about by improved diets composed more of rich protein (from animal raising) and vitamins (vegetable raising) rather than of traditional rootcrops which produce a carbohydrate-biased diet. This would entail a reeducation in eating habits as well. In the long run, income increases, which allow farmers to build better farm quarters and to gain more access to health/nutrition facilities, together with improved environmental conditions, may be expected to improve health conditions.

Such potential impacts, however, would interact with other factors affecting the health conditions of the community, such as the water and sewerage systems. The proper disposal of waste, water quality, and amount of available water are important especially for growing communities.

The provision of *informal education* would also affect health and nutrition as well as population and participation. This would be reinforced by the effects of changes in income levels and their attendant influence on household structures and decision-making. Also, children would be spared from farm activities and increases in income would allow them to continue their schooling. The impact of agro-forestation on these areas would thus work in a similar fashion with other projects, i.e., via income.

Agro-forestry has, for its direct products, ipil-ipil trees and other tree crops. Known ipil-ipil products are pulpwood, fuelwood, organic fertilizer inputs (leaves for compost), charcoal, and animal feeds. Another direct impact of agro-forestation would then be an increase in the nonoil based energy source such as dendro-energy. A substi-

tution of compost fertilizer for inorganic fertilizer would thus decrease imports of the latter.

Other indirect impacts of agro-forestation on energy use and on the balance of payments would be through: (a) the restoration of the vegetative cover, providing ample protection to watersheds, through which hydroenergy may be generated; (b) the prevention of flooding, thus averting expenses on infrastructure repairs, many of which have a high import content; (c) increased export of forest-based products; and (d) reduced import of pulp and paper products.

Progress and Impact Assessment: Time Frame and Indicators

Pilot agro-forestry projects are still at an early stage of implementation and are still experimental. Moreover, the literature indicates that it takes time for the impact on several areas of concern, such as the environmental services provided for by forestry and the increase in income of cooperators from forest products, to set in. Thus, a longer time frame for analysis is needed when a before-after framework is employed for an impact study; this is presented in Figure 1.

At this stage, only base line information may be gathered for the long-run impacts; such information may provide the "pre" or initial project conditions for the long-run impact study which looks into project cooperators and noncooperators, or into the project site and control sites, before and after a development project. The use of progress indicators (Table 1), however, may already be employed in looking at the potential ability of the project to achieve impacts.

Impact indicators suggested for analyzing the long-run impacts are presented elsewhere (de los Angeles 1983), together with a discussion of data sources and availability. They are discussed within the present study in the subsequent sections only when their roles are crucial in the initial conditions influencing the AFDP.

In the case of the short-run impacts, a look into differences between project cooperators and noncooperators in the same project site would be useful for: (a) determining whether the project already has a spread effect, in which case one may initially conclude that it is progressing considerably; and (b) looking into the differences and interrelationships in the impacts of various development projects in the uplands. The latter is particularly important when such development projects purportedly have the same general objective, i.e.,

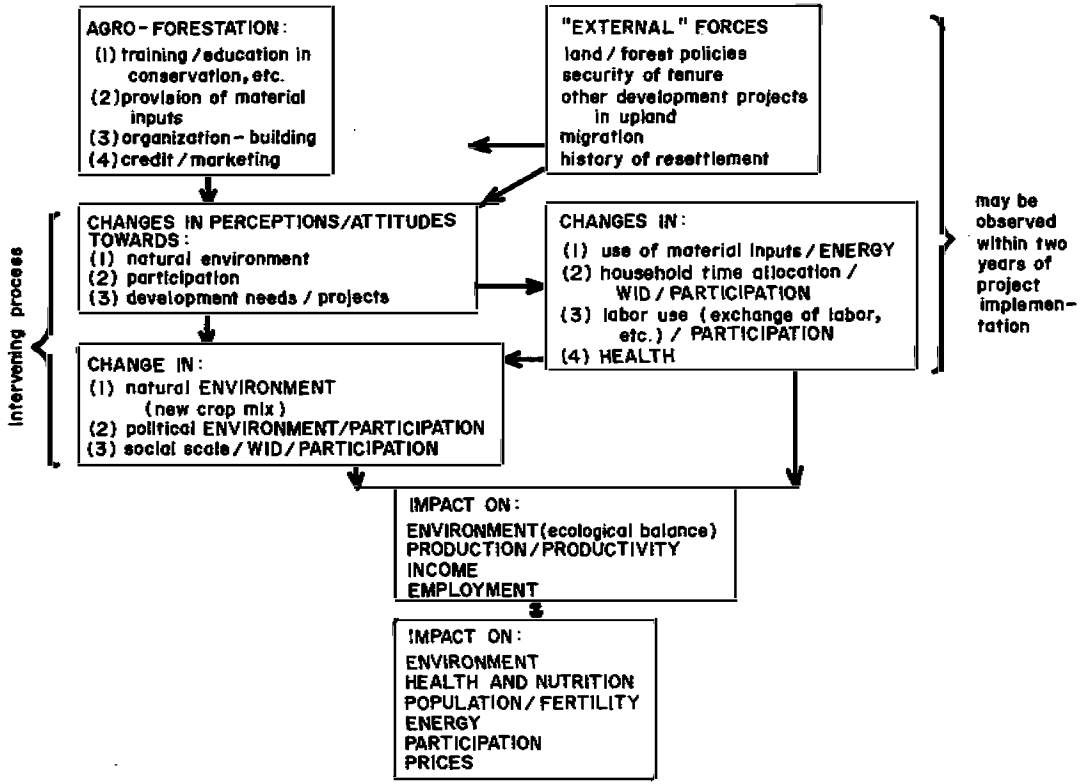

FIGURE 1
AGRO-FORESTATION AND ITS DIRECT IMPACT ON FARMER-COOPERATORS

TABLE I
PROGRESS INDICATORS

Indicator	*Direction of Change*	*Data base*
1. *On extent of agro-forestation or reforestation:*		
(a) proportion of land contour farmed or bench terraced	increase	farm
(b) proportion of land interplanted with agro-forestry crops, by type of crops	increase	farm
(c) proportion of land reforested with trees, by tree species	increase	farm and contiguous areas
(d) hectarage devoted to upland rice	decrease	farm
2. *On wood production by farm operators:*		
(a) area reforested, by species type	increase	farm
(b) survival rate of tree planted, by type of tree	increase	farm
3. *On agricultural production:*		
(a) volume of production, by type of product	increase	farm
(b) animals/poultry raised	increase	farm
(c) proportion of marketable surplus	increase	farm
4. *On stabilization of forest occupancy:*		
(a) number of kaingero-participants	increase	project area
(b) proportion of *kaingero*-participants awarded with forest occupancy permits/leasehold	increase	project area
(c) proportion of those with permits actually implementing prescribed agro-forestry systems	increase	project area
(d) kaingin-making, by area and frequency	decrease not sure	project area contiguous areas
5. *On access trails or roads constructed:*		
(a) number and length of trails constructed; trail density	increase	project area to existing transport systems
(b) length of road constructed; road density	increase	project area to existing transport systems

making the uplands productive and ecologically stable. Thus a cross-section type of analysis was conducted based on a survey of a representative sample of Pantabangan residents.

The indicators used for the short-run impact study are presented in Table 2.

TABLE 2
INDICATORS FOR ANALYZING THE SHORT-RUN IMPACTS OF AFDPs

IMPACT ON THE ENVIRONMENT

(1) attitude, knowledge, practice related to the environment: contour farming, bench terracing, crop diversity
(2) control of fire: (a) fire-fighting activities; (b) actual slash-and-burn practices
(3) land clearing by non-AFDP cooperators

PARTICIPATION/WOMEN IN DEVELOPMENT

(4) participation in AFDP implementing organizations by sex
(5) extent of cooperation in AFDP activities, by sex
(6) attitudes towards and interaction with government efforts at developing the community
(7) participation in other development projects

PRODUCTION/PRODUCTIVITY/INCOME

(8) land productivity
(9) animal raising
(10) income from agricultural crops, animal raising, and tree crops
(11) use of inputs: labor, fertilizer, land

OTHER AREAS OF CONCERN

(12) use of compost fertilizer

III. THE VILLARICA PILOT AFDP: PROGRESS AND IMPACT STUDIES

Villarica: Historical Background

Villarica is one of the five barrios in new Pantabangan, which is a resettlement site of households displaced during the building

of the Pantabangan Dam. Unlike other Pantabangan communities, it is composed mostly of kaingeros.

According to Baguinon's (1981) historical background of the barrio, the Villarica farm area, like most upland grasslands, was once covered by gregarious growth of virgin dipterocarp forest. Eyewitnesses to this forest describe the abundance of Yakal (*Hopea spp.*), Guijo (*Shorea guiso*) and Molave (*Vitex parviflora*). Today, remnants of the original forest cover are now confined to isolated spots usually along gullies and rarely along hill slopes and ridges.

Intensive logging during the mid-1950's onwards to the late 1960's gave swidden farmers or kaingeros easy access to logged-over areas and, hence, upland farms of the slash-and-burn type spread in the area. During the early 1970's, the majority of these farms, especially those along ridges and slopes, were abandoned, and in their place cogon (*Imperata cylindrica*) and talahib (*Saccharum spontaneum*) grasses became the dominant vegetative cover with alibangbang (*Piliostigma malabarica*), Binayuyo (*Antidesma, sp.*) and banana (*Lagerstroemia speciosa*) as the dominant isolated tree species.

The overall appearance of the area has since then resembled the savannah rather than the classic grassland. The savannah transformation has attracted ranchers to use the area as grazing land. Thus, for a few years, the area succumbed to uncontrolled burning with the ranchers aiming to maintain the area for pasture purposes.

By the mid-1970's, a group of Villarica farmers had driven the ranchers away and planted agricultural crops. It was in this setting that the Upland Hydroecology Research Program (UHP) of the University of the Philippines at Los Baños came in to launch the research on and implementation of a pilot agro-forestry development project.

The UHP-implemented pilot agro-forestation project at Villarica is one of the various attempts at development being implemented against a backdrop of generally poor conditions of the resettlement area.

To solve the interrelated problems of deteriorating watershed conditions, increasing poverty, and insufficient resettlement strategy, the following projects are being conducted: the R.P.-Japan Reforestation Project (at the Canili area); the BFD Communal Tree Farming Project (at Villarica); the human resource development project of the Action Research Group for Social Development

Foundation, Inc. (ARGSOD) at Malbang, East Poblacion, and West Poblacion; and other community-based projects of private groups such as World Vision. Numerous skill and training seminars have also been held for the Pantabangeños by the Ministry of Agrarian Reform, the Bureau of Fisheries and Aquatic Resources, and other government agencies. In addition, a larger project, that of the World Bank-financed Watershed Management and Erosion Control Project is being prepared for implementation on a major portion of some 24,600 hectares of the whole watershed.

The AFDP Project Implementor: The UHP

The UPLB Upland Hydroecology Program, a multidisciplinary research group, seeks to identify alternative means of regenerating various upland ecosystems by investigating the sociological, economic, climatic, soil, biotic, and hydrologic conditions prevailing in such ecosystems. UHP started implementing its research, training and outreach components in Villarica in March 1979. Its directly influenced farmers are members of the "Samahan ng mga Magsasaka sa Mataas na Bundok ng Bagong Pamayanan, Villarica, Pantabangan, Nueva Ecija" (SAMABUN), which is composed of 61-65 Christian farmers and 21 Igorots.

The UHP agro-forestry scheme for Villarica (Figure 2) was initially planned and was to be eventually implemented in the other barangays of Pantabangan. The upper portion of the diagram (above the broken lines) represents the means through which the Upland Hydroecology Program conducts agro-forestry activities. The lower portion of the diagram (below the broken lines) indicates the involvement of the Action Research Group for Social Development (ARGSOD) in human resource development at the areas of Malbang, East Poblacion, and West Poblacion, also of Pantabangan.

The ARGSOD has already been conducting organization and human resource activities at the Pantabangan resettlement; it facilitated UHP's entry into the agro-forestry project at Villarica. Both groups had planned to integrate their activities and to work for an expanded coverage of the pilot project, eventually to include some 4,000 hectares of the total area (24,600 hectares) which has been earmarked for the World Bank-NIA Watershed Management and Erosion Control Project for the Pantabangan-Canili-Diayo Watershed.

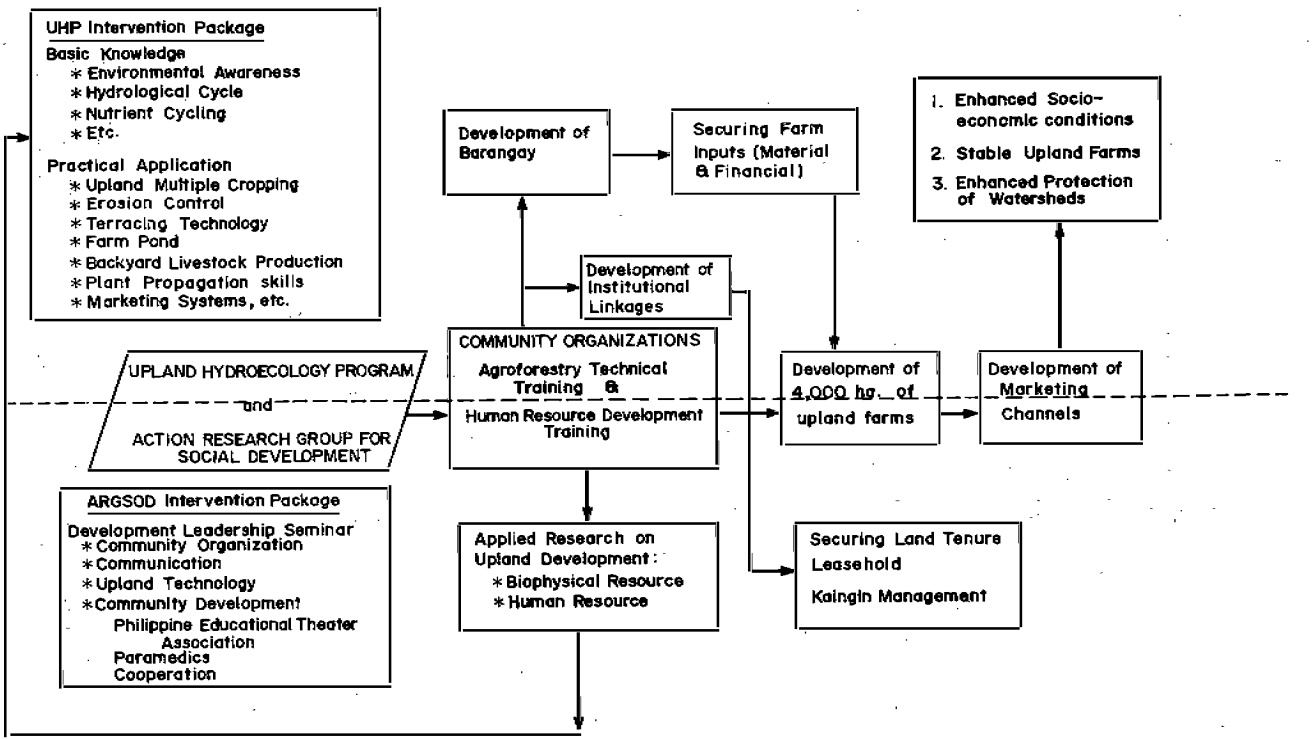

FIGURE 2
INITIAL AGRO-FORESTATION SCHEME FOR
VILLARICA, PANTABANGAN

The UHP initial linkages are illustrated in Figure 3 which depicts the initial funding component (DNR, NIA, Ford Foundation), research and outreach components (with AUDP and Kalahan Foundation), and links with other government units, such as BAI and UPSEC.

The Pilot Agro-forestry Project Design

The UHP agro-forestation involves the following activities: (1) the setting up of a demonstration farm; (2) the development of a barangay nursery; (3) the securement and provision of farm inputs; (4) the application of various agro-forestry schemes; (5) the continuous education of the farmers in upland technology; (6) the development of community organizations, communication skills, cooperatives for marketing, and other activities; and (7) the securement of land tenure. The pilot project covers approximately 150 hectares of farmland tilled by the SAMABUN's Christian members, and 50 hectares of the areas cultivated by the Igorot members.

During the first few months of project implementation in 1977, mangoes, citrus, coconuts, ipil-ipil, and other seedlings as presented in Table 3 were distributed to the SAMABUN members. The experimentation nursery was developed. Farmers' classes on conserva-

TABLE 3
SEEDLINGS DISTRIBUTED TO VILLARICA COOPERATORS IN 1979

Seedling type	*Number*
Mangoes	2,205
Budded citrus	12,436
Dwarf coconut hybrids	116
Cashew	10,050
Jackfruit	2,205
Coffee	13,923
Pili	3,350
Giant ipil-ipil (for borders)	20,000

Source: UHP (1980).

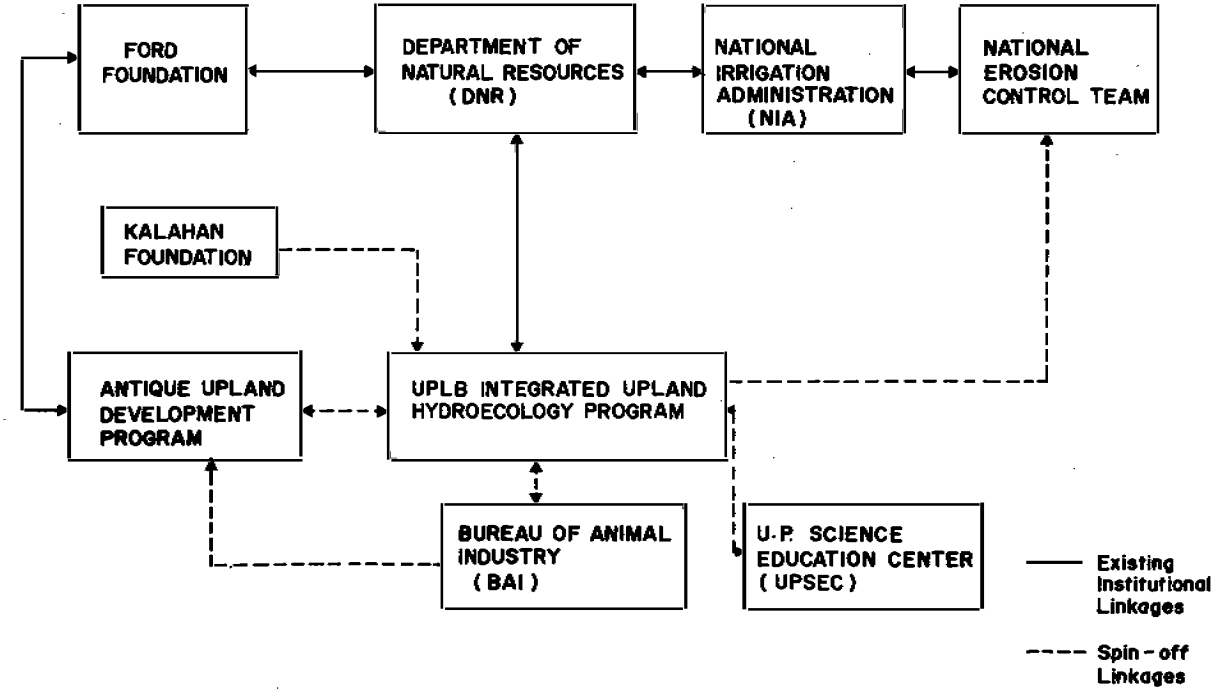

FIGURE 3
EXISTING AND GENERATED INSTITUTIONAL LINKAGES OF THE UPLAND HYDROECOLOGY PROGRAM IN 1978

tion concepts were held, and observation trips were made to UPLB and UHP stations in Mt. Makiling and Batangas.

The UHP generally facilitated the acquisition of the tree seedlings, and the farmers were left on their own with respect to adapting the suggested agricultural component. Diversification is a key feature of the AFDP, as depicted by the demonstration farm's layout in Figure 4. In addition, the following are illustrated:

(a) the construction of rice terraces;
(b) the presence of the following tree crops: kakawate, mango, jackfruit, citrus, coconut;
(c) the use of a legume, *stylosanthes guyanenses*, as cover;
(d) the interspersing of tree crops with agricultural crops such as sorghum, sweet potato, mapinta;
(e) a well and a farm pond (marked "W" and "FP");
(f) the training center (SP); and
(g) a pasture area for goats and carabao.

The demonstration farm serves as an experiment station for the researchers and as a concrete example to the farmer cooperators on how agro-forestation could benefit from: observations of schemes at the demonstration farm, UHP training activities, and community efforts to develop and maintain the nursery aside from the farm.

Data Sources and Limitations

The major events directly relevant to the implementation of the Villarica AFDP and the present analysis are summarized in Table 4. The timing of the studies conducted by various research groups vis-à-vis the important AFDP-related activities indicate that: (a) base line information is available from the NIA-IBP, MADECOR, and NCSO studies; (b) researches which are conducted by the project implementors characterize initial AFDP and community conditions; and (c) the ESIA/WID survey was undertaken only within two years of project implementation.

The ESIA/WID survey – conducted a year after the UHP socio-economic surveys were made – was designed mainly to look into the project processes, initial impacts, and interrelationships with other development projects. It focused on a sample of Pantabangan residents, including the Villarica AFDP cooperators. On the other hand, the UHP studies focused on Villarica residents only. Differen-

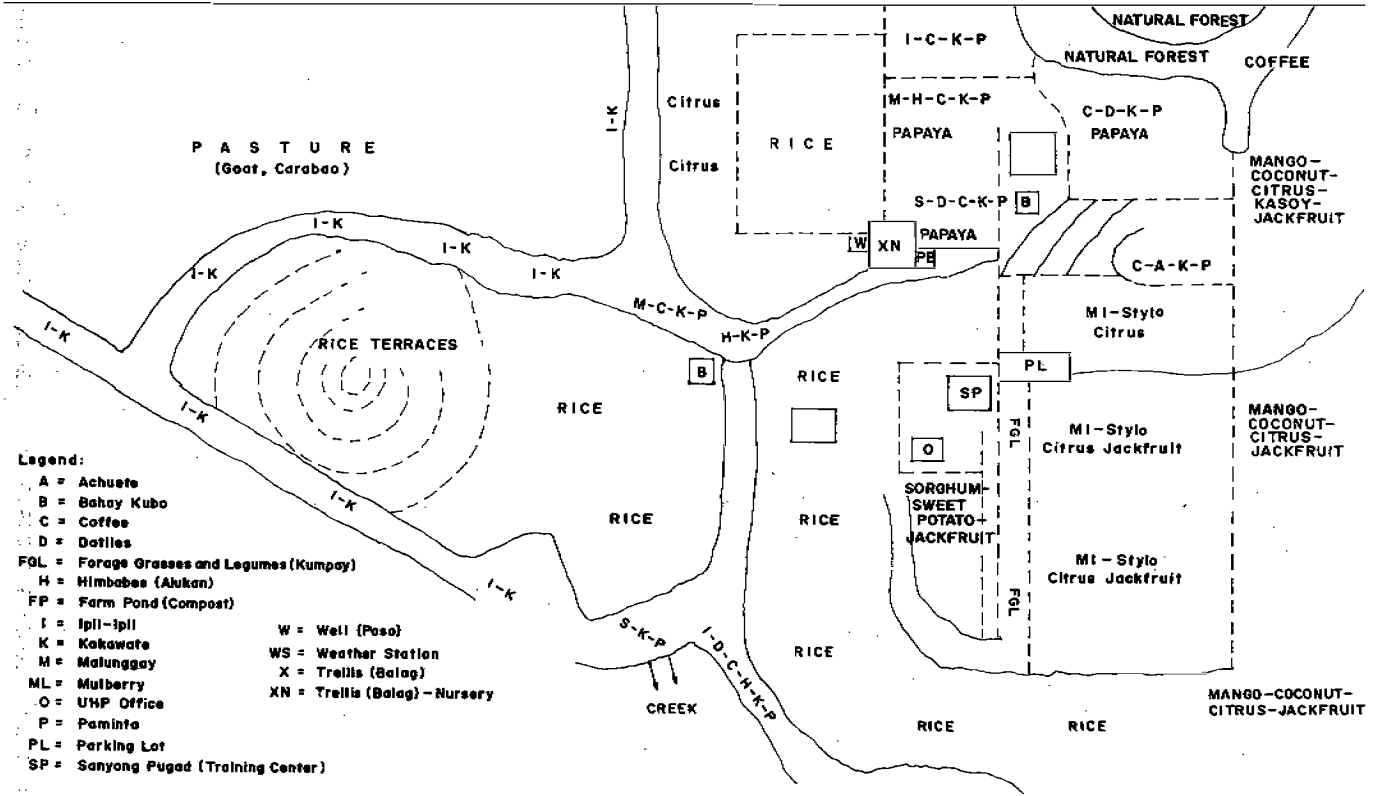

FIGURE 4
THE VILLARICA AFDP DEMONSTRATION FARM

TABLE 4
MAJOR EVENTS WHICH ARE RELEVANT TO AGRO-FORESTATION IN VILLARICA, PANTABANGAN

Quarter / Year	January-March	April-June	July-September	October-December
pre-1978	*relocation of old Pantabangan town residents to New Pantabangan and other resettlement sites (1973) *provision of support activities such as the World Food Program; training of skills in fishing, rabbit raising, dressmaking, among others. °surveys conducted by NIA-IEP, NIA-MADECOR, NCSO.			
1978		*ARGSOD orientation and ship training program – start of series of training seminars (representative sample of Pantbangan residents) covering 200 participants	*identification of constraints of grassland rehabilitation (UHP)	*start of BFD communal tree farming (21 Villarica families) *first publication of Balitang Pantabangan
1979	*organization of SAMABUN Christian cooperators *preparation of UHP demonstration farm *start of transport of seedlings to Villarica	*UHP intensive farmers' classes *start of ARGSOD Phase II *petitions for provision of inputs filed at different government agencies (ARGSOD) non-Villarica	*organization of Igorot cooperators of UHP AFDP °UHP survey (economics team)	*first meeting of credit union (ARGSOD) *establishment of permanent orchard nurseries

Table 4 (Continued)

Quarter / Year	January-March	April-June	July-September	October-December
			°ARGSOD evaluation of trainees	°UHP survey (sociology team)
1980	*building of farm ponds (UHP) *preparation of marketing arm for funding by PBSP and registration with SEC *seeding of fruit trees at nurseries (SAMABUN) *building of training center for farmers at demonstration site (UHP) *preparation of study site (UHP) *building of fire breaks	*allocation of seedlings to SAMABUN members *zoning of individual farms	*preparation of credit union's registration with MLGCD (ARGSOD) *typhoon ARING	°ESIA/WID survey *replacement of Pantabangan Mayor

ces in survey instruments between the ESIA/WID and the UHP surveys also deterred any comparisons between variables covered by both surveys.

In addition, the ESIA/WID survey employed nonstratified random sampling for its research design to assure the inclusion of an adequate number of respondents who were taking part in various forest conservation activities. On the other hand, the earlier studies conducted by the MADECOR, NIA/IEP and NCSO did not use the same sampling design. Thus, any comparisons that may be made on certain variables covered by the two sets of studies are either supplemented by additional information or made with certain qualifications in the present study.

In addition to these information sources, the UHP annual reports, the research papers produced by graduate students working under the advisorship of UHP personnel, and data gathered through constant communication with project implementors were used in the progress and impact studies. More often than not, such information is unbiased since it is generated by individuals who are interested in learning lessons from the pilot project being undertaken on agro-forestation. In fact, the present investigator found the project implementors quite frank about their own assessment of the project's progress, whether positive or negative.

Villarica: Site Profile

a. Environment

The soil characteristics of the Villarica cooperators' farms are presented in Table 5. They indicate that (1) the soil is more acidic, (2) organic content is lower, and (3) available phosphorus is lower in content than that of Puting Lupa, Mt. Makiling. However, the available phosphorus for the Villarica sample (2.16 ppm) is higher than that of the sample obtained from another part of Pantabangan (1.56 ppm).

Lucero's (1981) study of termites at a .6-hectare farm left unattended by a farmer who had found employment at the BFD local office yields important information. The farm was intentionally burned earlier, to facilitate clearing and subsequent cultivation. The dominance of cogon, which is characteristic of areas subjected

TABLE 5
SOIL CHARACTERISTICS OF VILLARICA AFDP COOPERATORS' FARMS[a]

Farm Lot Number	pH	Organic Matter (%)	Available phosphorus (ppm)	Calcium (ml/100g)	Magnesium (ml/100g)
1	5.70	0.75	0	34.71	12.97
2	5.10	3.22	1.40	20.45	12.67
3	5.55	3.19	0.70	36.60	10.31
4	7.20	4.60	26.95	33.99	6.87
5	6.18	2.79	8.05	29.67	9.64
6	6.05	2.41	7.70	28.69	9.45
7	5.55	2.59	5.95	33.93	12.37
8	6.18	1.96	2.80	38.49	8.59
9	5.32	2.59	0	28.17	10.87
10	5.42	2.51	0	27.53	11.57
11	5.50	2.67	0	16.67	7.63
12	5.65	3.34	5.60	36.74	9.66
13	5.32	2.84	4.20	22.32	7.45
14	5.72	2.60	0.35	23.82	10.15
15	6.10	2.48	4.55	32.10	6.99
16	5.20	2.67	0.35	24.47	15.83
17	5.40	3.00	0.35	37.27	13.05
18	5.25	2.22	0	16.26	11.82
19	5.32	3.32	0	14.04	10.20
20	5.20	1.70	0	26.34	8.79
21	5.58	3.45	2.45	31.13	12.32
22	5.60	0.97	0	30.91	10.43
23	5.95	2.70	1.75	3.24	9.24
24	5.28	2.41	0	33.03	12.78
25	5.72	3.67	10.85	30.76	10.05
26	5.90	1.89	2.45	35.31	12.46
27	5.65	2.41	1.05	31.10	9.62
28	5.30	3.06	16.45	27.41	10.57
29	5.85	2.93	2.10	33.85	12.54
Average	5.65	2.65	3.66	29.18	10.58

a. Taken at a depth of 0-20 centimeters.
Source: Lucero (1981).

to burning, and the presence of the fire-tolerant species, alibang-bang, is evident.

Lucero's findings indicate the following:

(a) Soil pH, organic matter and nutrient content of termite-modified soil are generally lower than those of surrounding soil.

(b) "The amount of soil carried by termites above ground is strongly dependent on the amount of litter biomass on the ground" as in the case of higher soil transport figures for the secondary forest area.

Another study by a UHP researcher, Baguinon (1981), focuses on earthworm activity to gather basic information related to the earthworm's role in enhancing soil fertility. Baguinon's study indicates that: (a) there are "more earthworm species in secondary forests than either grassland or ipil-ipil"; (b) factors other than pH or soil acidity affect earthworm species distribution and composition; and (c) earthworms' seasonal activities are affected by the rainfall pattern. The study then recommends further research on some species in Villarica to focus on the following: (a) grassland fire management aspects related to earthworm activity, and (b) production and dissemination of earthworm species which can survive deforestation and which could aid in the restoration of soil fertility.

Notably, such studies are generally exploratory and therefore need to be followed by other researches. Moreover, they present early project conditions of the Villarica farms; they do not focus yet on farms which have applied the agro-forestation scheme.

b. Income, Production/Productivity and Labor

Tables 6 and 7 illustrate the income distribution of a sample of Villarica cooperators and noncooperators, based on a survey by the UHP sociology research team. The annual family income before the farmers resettled in Villarica was higher, on the average, than the income after resettlement, even while the figures are expressed in current terms. For instance, for the UHP cooperators, only 8.5 percent reported an annual income of at most ₱1,000; in 1978, 41 percent already reported such income. Obviously, farmers' income (at least from their point of view) decreased considerably

TABLE 6
ANNUAL FAMILY INCOME BEFORE RESETTLING IN VILLARICA

Income	SAMABUN Members		Non-Members	
	Number	Percent of total	Number	Percent of total
P1,000 or below	5	8.5	2	13.3
P1,001 – P3,000	16	27.1	3	20.0
3,001 – 5,000	16	27.1	4	26.7
5,001 – 7,000	14	23.7	2	13.3
7,001 – 9,000	4	6.8	2	13.3
9,001 – 11,000	2	3.4	1	6.7
above 11,000	–	–	1	6.7
no estimate	2	3.4	–	–
Total	59	100.0	15	100.0

Source: Samonte (1980, Table 8).

TABLE 7
TOTAL INCOME OF VILLARICA RESPONDENTS IN 1978

Income	SAMABUN Members		Non-Members	
	Number	Percent of total	Number	Percent of total
P1,000 or below	24	40.7	6	40.0
P1,001 – P3,000	27	45.8	4	26.7
3,001 – 5,000	4	6.8	4	26.7
5,001 – 7,000	3	5.1	1	6.7
7,001 – 9,000	1	1.7	–	–
Total	59	100.0	15	100.0

Source: Samonte (1980, Table 9).

upon transfer to the resettlement area. Floro (1980a) thus speaks of the "marginalization of farmers" due to the displacement which occurred after the dam's construction.

Several private and public agencies provided assistance to the community to improve the quality of life of the newly resettled Pantabangeños. The World Food Program donated food while the Ministry of Agrarian Reform (MAR) gave out subsistence loans and direct production assistance.

Farm production is mostly for subsistence, especially in the case of rice. Table 8 shows that 88 percent of the UHP economic research team's survey respondents consumed all of the rice that they produced and that vegetable production did not have a marketable surplus, while the fuelwood gathered was mainly for household consumption. Floro (1980) reported on production becoming more labor-intensive, though channelled at low productive activities, partly due to a marked lack of alternative income-gathering activities. Floro's analysis was based on the figures presented in Table 9 which were gathered through interviews with some of the farmers. More man-days are spent on land preparation, watering, and weeding in the upland area than in the rainfed lowland farm. The overall difference in labor input amounts to 120 man-days.

Contrary to the 1974 Pantabangan profile of cash income coming mainly from employment, the major occupation particularly for the Villarica residents in 1979 was farming. This is evident from Table 10 which shows a small difference between the proportion of farmers for the project cooperators versus the noncooperators.

Employment in the National Irrigation Administration (NIA), which is a prominent government agency in the watershed, has not been a promising source of income. Table 11 shows that, of the high percentage of Villarica residents who formerly worked at NIA (in 1974), 61 percent were permanently terminated from their jobs. In addition, of those 16 who were still employed with NIA in 1979, four laborers, or 25 percent, were temporarily terminated, i.e., laid off for a few months before being hired again.

And yet, prospects for employment with other agencies or a private firm may be bleak, since there is not much commercial activity in the watershed, and the education of the residents is inadequate. Table 12 shows that only 3.4 percent of the Villarica project cooperators have had some college education.

TABLE 8
PERCENTAGE SHARES OF SELECTED TOTAL OUTPUT TO THE MARKET, BY NUMBER OF SAMPLE HOUSEHOLDS AS OF 1979, VILLARICA, PANTABANGAN, NUEVA ECIJA

Percentage sold to market (%)	TYPE OF OUTPUT: Palay No. of households engaged in production[a]	Palay Percentage	Vegetables No. of households engaged in production	Vegetables Percentage	Fuelwood No. of households engaged in production	Fuelwood Percentage	Fish No. of households engaged in production	Fish Percentage
0	35	87.5	14	30.4	51	83.6	3	50
1 – 20%	3	7.5	4	8.7	3	5	–	–
21 – 40%	1	2.5	3	6.5	–	–	–	–
41 – 60%	1	2.5	4	8.7	1	1.6	1	16.7
61 – 80%	–	–	5	10.9	–	–	–	–
81 – 100%	–	–	7	15.2	6	9.8	2	33.3
Total	40	100.0	46[b]	100.0	61	100.0	6	100.0

a. This includes households who rent out their farms and get a share of the harvest.
b. Figures do not add up to total.

Source: Floro (1980b), Table 2.

TABLE 9
COMPARISON OF LABOR REQUIREMENT IN LAND CULTIVATION (FOR PALAY), 1972 AND 1979
BARRIO VILLARICA, PANTABANGAN, NUEVA ECIJA

Tasks	Total man-days for land cultivation (per hectare)	
	Before resettlement[a] 1972	After resettlement[b] 1979
Land Preparation		
Land clearing (*Paghahawan*)	12	89
Plowing (*Pag-aararo*)	12	18
Planting (*Pagtatanim*)	6	3
Watering (*Pagdidilig*)	12	45
Weeding (*Paggagamas*)	30	36
Fertilizer application	.2	.5
Harvesting and processing (*Pag-aani at Pagpapasan*)	34	39
Total	106.2	229.5

a. This is for a rainfed lowland area.
b. This is for a nonirrigated upland area adopting the nonburning method of clearing.
Source: Floro (1980b), Table 3.

TABLE 10
PRIMARY OCCUPATION OF VILLARICA RESPONDENTS, 1979

Occupation	SAMABUN Members		Non-Members	
	Number	Percent of total	Number	Percent of total
Farmer	51	86.4	11	73.3
BFD employee	2	3.4	–	–
UHP laborer	1	1.7	–	–
NIA laborer	2	3.4	1	6.7
Sotrekeeper	1	1.7	–	–
Hair stylist/ dressmaker	1	1.7	–	–
Driver	–	–	1	6.7
Fisherman	–	–	2	13.3

Source: Samonte (1980), Table 54.

TABLE 11
1979 STATUS OF NIA's TEMPORARY LABORERS FROM BARRIO VILLARICA, PANTABANGAN, NUEVA ECIJA HIRED IN 1974

	Number	Percent[a]
Temporary NIA laborers	16	39
a) No period of termination	12	29
b) Temporarily terminated between periods of employment	4	10
Permanently terminated NIA laborers	25	61
a) Urban worker (outside Pantabangan)	8	24
b) Kaingin farmer	10	20
c) Marginal employment	3	7
d) Fisherman	2	5
e) Unemployed	2	5
Total	41	100

a. The sum of percentages is slightly above 100 because of the rounding of figures.

Source: Floro (1980a), Table 16; based on data from NIA Records Division, Pantabangan, Nueva Ecija.

TABLE 12
EDUCATIONAL ATTAINMENT OF VILLARICA RESPONDENTS, 1979

	SAMABUN Members		Non-Members	
	Number	Percent of total	Number	Percent of total
None	7	11.9	1	6.7
Grade I-IV	15	25.4	8	53.3
Grade V-VI	30	50.8	5	33.3
I-IV years, high school	5	8.5	1	6.7
I-V years, college	2	3.4	—	—
Total	59	100.0	15	100.0

Source: Samonte (1980), Table 3.

The educational profile is a little better for the respondents' family members: the nonproject cooperators' distribution of family members according to highest educational attainment indicates better educated siblings (Table 13).

With such a minimal chance of improving the standard of living for most residents of Villarica, it is no wonder, then, that outmigration occurs more frequently among the tenant farmers, as well as among the hired nonagricultural workers (Table 14). The presence of landless workers is also indicated in the table.

TABLE 13
EDUCATIONAL ATTAINMENT OF VILLARICA RESPONDENTS' FAMILY MEMBERS, 1979

	SAMABUN Member		Non-Member	
	Number	Percent of total	Number	Percent of total
None	83	28.4	24	25.3
Kindergarten	9	3.1	7	7.4
Grade I-IV	70	24.1	15	15.8
Grade V-VI	62	21.3	26	27.4
1st – 4th year, H.S.	57	19.6	10	10.5
1st – 4th year, college	9	3.1	13	13.7
Graduate	1	nil	–	–
Total	291	100.0	95	100.0

Source: Samonte (1980), Table 5.

TABLE 14
OCCUPATIONS OF OUT-MIGRANTS FROM BARRIO VILLARICA, PANTABANGAN, NUEVA ECIJA AS OF JANUARY, 1980

Occupation	Number	Percent
1. Tenant-farmer	13	45
2. Hired non-agricultural worker	10	34
3. Owner-cultivator or independent farmer	3	10
4. Self-employed	2	7
5. Agricultural landless worker	1	4
Total	29	100

Source: Floro (1980b), Table 4.

Progress of the Villarica AFDP

The progress of the Villarica AFDP is discussed here in terms of observed environmental changes, participation in agro-forestation activities, and achievement according to the project implementors' initial scheme. Some of the important progress indicators discussed under the section on project processes and impacts are excluded in the present section.

a. Environmental changes

A most notable effect of agro-forestation in Villarica concerns the frequency and extent of burning in the farms. In the past, fire always occurred in the summer. However, SAMABUN members have since then minimized burning; they built firebreaks around their farms before the advent of the dry season. They also came up with improved, labor-saving methods for building firebreaks. To build wider and more effective firebreaks with less labor, they cut grass on both sides of the width of the firebreak, resulting in two parallel lines of cut grass and a line of uncut grass in the middle of these lines. Instead of expending labor to cut the middle line of uncut grass, farmers just piled the cut grass on the middle line and burned the whole thing, thereby preventing the spread of fire from surrounding areas into the farms due to the presence of fire lines.

In addition, each farmer devised his own unique strategy of putting fire out through practical experience. Fire prevention may be the farmers' response to the presence of forestry crops in the area, which they now want to protect. Such is not the case when only agricultural crops are grown (by the traditional upland farmer).

Another noteworthy indicator of the project's progress is the extent of terracing and contouring of farms. During the first two years of the project (1979-80), only two farmers constructed bench terraces (for rice) and practiced contour planting. More recently, however, during a visit to the project site in February 1982, a visual inspection of the cooperators' farmers gave us a rough count of *at least* 9 bench terraces and/or vegetatively contoured farms. One explanation offered by the implementors for the spread of technology from the demonstration area is that most farmers noticed the differences in soil erosion and farm landslides during typhoon *Kading* between their farms and the demonstration farms. Also,

higher yields were said to be observed in the barangay captain's (demonstration) farm compared to yields in the past.

One can also note the women who were on their way to nearby creeks to fetch water for the farm.

In terms of seedling survival rates, conditions in the uplands provided important insights to the project implementors. For instance, they found out that citrus seedlings did not grow well in uplands. This was attributed to the inhospitable climatic conditions in the area and to transplantation shock, causing very high mortality in the bare root seedling of ctirus. Hence, it was decided that in the future, these seedlings, rather than being uprooted and transported from Los Baños, shall be raised in the nursery.

When planted during the rainy season (around August) the citrus seedlings had about 20 percent survival in the grasslands and about 70 percent survival in the cultivated fields. During summer, even potted seedlings maintained in home nurseries died.

The performance of mangoes and coconuts was better than expected, however. Coconut seedling survival rate was as high as 90 percent; this was, in fact, one of the criteria for the award given by the SAMABUN to its "best farmer" in 1981.

Project implementors also noted that the mangoes and coconuts did very well despite the widespread attack of "powdery mildew" which came after typhoon Kading.

Pole *sitao*, bush sitao, and mongo seeds were among the agricultural crop inputs distributed to the farmers. Rat infestation, however, was widespread in the area. The young shoots of the mango and citrus seedlings were eaten by rats especially at the height of the dry season. This situation was expected as the rats, seeing no other green forage in the dry area, found a source of food in the farmers' seedlings. Luckily, many of the seedlings survived by producing new shoots. The damage, however, was enough to send the BFD personnel looking for chemical poisons to deal with the rats attacking their reforestation plantations. The destruction of the original forest vegetation of the area and the subsequent substitution of a grassland ecosystem have destroyed the original homoestatic mechanisms (i.e., predator-prey relationships), resulting in high pest infestations. It can then be expected that any increase in productivity which the farmer will be able to develop

in the area will be offset by a subsequent increase in pest (rats, insects, weeds, etc.) infestations. However, the presence of diverse crops over time and space is expected to minimize if not prevent these infestations. Most farmers still planted these crops.

The summer months are particularly hard on the farmers and their crops. The SAMABUN members divided themselves into teams and each team followed a certain schedule so that there would be a team to water and take care of the nursery seedlings *everyday*. Since the source of the water is on a gulley and the nursery is above this gulley, they had to form human chains to pass buckets of water from the source to the nursery. Now, though, a water pump in the nursery has been put up.

One of the early strategies that was tried to solve the water problem was to dig "farm ponds" on lower sloping areas of farms so as to catch and store rainwater during the wet season. Though water in the pond may dry out by the middle or end of the season, it would at least lessen the water stress of the farmer's crops as well as extend his cropping season. The pond was also envisioned to serve as a source of water for fire control, as a fishpond, and also for monitoring sedimentation.

Problems related to the digging of the pond, however, were quite substantial. For one, the loose structure of the soil necessitated the use of plastic or cement to seal the pond from water seepage. Farmers lacked the financial and material resources for building the pond, and the heavy manual labor (which competed with the labor needs of other farms) needed to dig and build the pond made this feasible. Approximately 90 man-days of work were measured for pond building. At present, the farm pond in the demonstration farm is being used for composting.

Water supply in the demonstration farm is no longer a problem, however, because of a deep well pump whose establishment was partly financed by donations of students of U.P. at Los Baños. Having seen the feasibility of a deep well pump, the SAMABUN members are currently considering obtaining funds for this through the KKK Program.

Some of the activities initially planned for the project have yet to be realized. For instance, though the Bureau of Animal Industry had already committed its support of the SAMABUN through its animal dispersion program, this has yet to be realized. Perhaps, this is just as well, since the envisioned use of *stylosanthes guya-*

nensis as cover crop to aid in suppressing further cogon growth as well as to provide forage for animal has not materialized. The "stylos" planted was attacked by a disease named "antrachose." Project implementors are thus currently improving on the planting schemes, including that of stylos and other cover crops.

b. Participation

An important indicator of the progress of the AFDP in Villarica might be the continued participation of the original farmer-cooperators. As of 1982, the following cases of dropping out from the SAMABUN were notable: (a) the resignation of a member-couple (husband and wife) from the SAMABUN and their subsequent migration to Isabela; (b) the selling of kaingin rights of one farmer cooperator to another SAMABUN member; (c) the neglect of the farms by two members who each became employees of BFD and the local municipal office; and (d) the SAMABUN secretary's participation in a tree/monoculture type of reforestation scheme being tried out in Pantabangan.

The tree monoculture type of reforestation is being implemented by the Nueva Ecija Electric Cooperatives Organization (NEECO) for the establishment of ipil-ipil dendro-energy farms. Inputs worth ₱2,000 were provided as a loan along with one cavan of rice. The SAMABUN secretary stressed his consumption needs as the main reason for having joined the NEECO scheme.

In the cases of the out-migrants and the farmer who sold his kaingin right, the project implementors noted that these were farmers who used to be tenants in the old Pantabangan farm. A hypothesis suggested for testing by the project implementor is therefore one which explains farmer performance in terms of his former land tenure/farm labor status, among others. For those who became employed, the other family members (wives and children) are now the main workers on the farm.

In general, however, the SAMABUN seems to have a good degree of control over its members. This may be gleaned from Table 15 which is based on the organization's records. The discussion on attendance and tardiness during meetings, and on absences from work supposed to be contributed by all in the demonstration farm and nursery, indicates several aspects of participation.

TABLE 15
CONTENT ANALYSIS OF VILLARICA-SAMABUN MEETINGS

Date	Type of meeting	Topic discussed/action taken	Agency/ Person concerned	Attendance*
April 1, 1979	general	Formal request for seedlings of grapes, lemon, etc., from Mr. Bernardo Dison of Bongabong, Nueva Ecija	private	65 members
April 8, 1979	general	Formal request for 20,000 coconut seedlings for SAMABUN members	PHILCOA	65 members
	general	Formal request for seedlings of ginger, mongo, beans, peanuts, etc.	UPLB-UHP	65 members
May 6, 1979	planning committee	Formal request for borrowing tractor or plow for levelling land before planting cash crops	NIA	13 members
May 13, 1979	general	Formalizing request for individual forest occupancy management permits to be granted to all members; as of this date, only 15 members were granted such permit	BFD	65 members
June 13, 1979	general	Formal request for 5,000 cashew and 5,000 giant ipil-ipil seedlings.	UPLB-UHP	62 members
June 14, 1979	general	Request for action on encroachment of cows owned by a certain Dr. Mario Virgel on the farm areas, in accordance with BFD information that all pasture permits have already been cancelled for the area	President Marcos, thru BFD Dir. Ardieta	62 members
August 12, 1979	general	Resignation of Mr. Sadaba as Chairman of the Samabun, due to his having to attend to his duties as pastor; election of Mr. Dullas as chairman		62 members
August 19, 1979	planning and implementing committees	Acceptance of new member, Ms. Virginia Dullas, done after an assessment of the applicant's farm practice was made		committee members
August 26, 1979	planning and implementing committees	Conversion of the farm of Mr. R. Fernandez into a common nursery; all members take turns working in the nursery on Sat. or Wed.; fines were imposed on those who did not render service without justifiable reasons.		committee members

Table 15 (Continued)

Date	Type of meeting	Topic discussed/action taken	Agency/ Person concerned	Attendance*
September 2, 1979	planning and implementing committees	Request for grant of additional land for the SAMABUN, presently located between individual members' farms.	BFD District Office	committee members
		Allowing children of women-members to represent the latter in case of absences due to maternity or health problems and the inability of the husband to attend due to being employed or working elsewhere.		
September 9, 1979	executive committee	Allowing proxies for Samabun members working the nursery; once a month only, with proper notification and approval of the team leader.		Executive committee members
September 26, 1979	letter sent to PC-INP	Informing the authorities on the watch teams formed by the Samabun to guard the nursery from theft; schedule of watch teams and names of team members submitted.	PC-INP	
November 22, 1979	executive, implementing & planning committee	Communication on animals raising	BAI	members of committee (14/26-54%) three out of four women com. members were present
		Additional land needed; work for 25-year lease	BFD District Office	
		Measurement/mapping of nursery and demonstration farm	UHP-UPLB	
December 3, 1979	general	minutes not available	UPLB	total, 43/65 (=66%) women, 13/21 (=62%)
December 13, 1979	executive, implementing & planning committees	Distribution of citrus, coconut seedlings; elevation of request for land lease to the President; study groups to be sent to UPLB; firebreaks; problems – maternity leave, members who did not want to pay fines;	UPLB	total, 20/21 (=95%) women, 3/3 (=100%)

Table 15 (Continued)

Date	Type of meeting	Topic discussed/action taken	Agency/ Person concerned	Attendance*
December 29, 1979	executive, planning & implementing committees	Stopping of the distribution and bringing in of coconut seedlings; fines on those who would not contribute their labor share in the nursery/demonstration farms; guarding of the nursery; establishment of firebreaks		total, 17/21 (=81%); women, 1/3 (=33%); three noncommittee members one of whom was male and two female also attended
March 2, 1980	executive, planning & implementing committees	Plans for establishment of firebreaks, discussion of proposed NEECO dendro plantation; benefits, and effects on Samabun activities	NEA	total, 11/21 (- 57%); four noncommittee members attended, three of whom were women; none of the women committee members attended
June 29, 1980	general	minutes of meeting not available		total, 57/65 (=88%); women, 16/21 (=81%); one wife subtituted for her husband
October 5, 1980	executive, planning & implementing committees	minutes of meeting not available		total, 11/21 (-52%); women, 1/3 (=33%); three nonmembers attended, two of whom were women
October 7, 1980	general	minutes of meeting not available		total, 44/65 (=68); female, 12/21 (=57%); two nonmembers attended, one of whom was the wife of a member
October 26, 1980	general	Fines on tardiness during meetings; better scheduling of meetings		total, 34/65 (=52%); women, 13/21 (=%); two women substituted for husbands; two nonmembers also attended

*Records on attendance are discernible only starting November 22, 1979.

The Villarica SAMABUN has a relatively good record-keeping system compared to the organizations of the other barangays of Pantabangan.

Table 15 shows that the type of organization building of the UHP in Villarica seeks to develop self-reliance of the organization; thus, it is the farmers themselves who try to secure their farming requirements from the different bureaus. This means that the farmers get to relate with numerous agencies/persons, including the President himself, by way of a letter on the need to cancel the permit of an encroaching and illegal pasture-manager.

In terms of women's participation, 21 out of the 65 members of the organization are female, representing 32 percent of total membership. The organization has also made arrangements for the consequences of women's involvement in work and meetings. For instance, in cases of maternity leave, an adolescent may take over work at the farm and other organization-related duties. Also, during absences of women members from meetings held by the executive/planning/implementation committees (of whom three out of 21 members are women) other female noncommittee members are present, implying that they may be pinch-hitting for the absentee women members. This is not observed among the male committee members.

Women's participation in the SAMABUN may have been encouraged by certain SAMABUN rules on the distribution of benefits of the organization. Whenever a husband and wife become members of the organization, they each get their respective allocations of seedlings for the total membership; thus, their family benefits doubly from the organization. This also implies that the family is more involved in organizational work as well as in agro-forestation.

An effort to involve other Pantabangan residents in agro-forestation was attempted in early 1981. Through the suggestion of the UHP and the SAMABUN, a committee on agro-forestry was created at the newly elected mayor's office. Training on AFDP concepts was conducted at UPLB. The interest in AFDP, however, did not immediately produce concrete manifestations. This was explained by project implementors and other observers in terms of the following: most task forces were not formally chosen by the barangay members to be official representatives to the Committee.

More recently, however, the Villarica barangay captain was chosen to head the newly formed Federation of Barangays in Pantabangan. Such a development would provide more possibilities for facilitating the spread of AFDP schemes.

Moreover, the BFD Communal Tree Program (CTF) which has developed along a parallel time scheme, and which involves some of the SAMABUN participants as well, has also been progressing. In fact, the Villarica CTF won the first prize national award of ₱16,000 in 1979 and ₱4,000 from the recent regional competition among CTF farmers. The progress of the CTF is presented in Table 16 in terms of farmer cooperation and area planted.

TABLE 16
COVERAGE OF THE BFD COMMUNAL TREE FARMING PROJECT IN PANTABANGAN

A. PHASE I Villarica, Pantabangan, Nueva Ecija (December 1978)	
No. of participant families	21
Total area	48 ha.
Area planted with trees	46.31 ha.
Area planted with agri-crops	23.5 ha.
B. PHASE II (Parcel 1) Km. 6, Pantabangan, Nueva Ecija (January 1980)	
No. of participant families	48
Total area	28.47 ha.
Area planted with trees	121.79 ha.
Area planted with agri-crops	64.35 ha.
C. PHASE II (Parcel 2) Km. 8, Pantabangan, Nueva Ecija (January 1980)	
No. of participant families	19
Total area	50 ha.
Area planted	31.87 ha.
D. Total Number of Participant Families	88
Total area covered	226.47 ha.

Source: BFD Pantabangan District Office.

c. Implementation Aspects

As of 1982, the pilot project was still being conducted separately by the UHP while ARGSOD had initiated parallel agro-forestation attempts along with the latter's human resource development programs in the other barangays. Attempts between the leaders of the UHP team in Pantabangan and the ARGSOD to coordinate their activities have been concretized only insofar as the conceptual framework for implementation is concerned.

Difficulties arise in the actual coordination between the two groups partly because of their differences in discipline. The UHP team in Pantabangan is composed mostly of natural scientists, while the ARGSOD is a social science group. Thus, problems in communication among the various individuals composing the two groups have cropped up.

Moreover, emphasis of the processes involved in implementing development projects varies between the two groups. While UHP emphasizes the "man-land" relationship, ARGSOD gives priority to the "man-man" relationship. For the moment, the two groups have ceased coordinating with each other.

Problems of similar effects may also be noted within the UHP itself. For instance, the research, the sociology and economics study teams of UHP each conducted their own socioeconomic surveys in Pantabangan separately. Disagreements arose on matters regarding sampling and the type of questions to ask. Also, project implementation did not really turn out to be multi-disciplinary. Such problems are perhaps inherent in such a group, due to varying orientations, communication skills, and other factors.

As of early 1982, the AFDP in Villarica was being undertaken more on a voluntary basis by some of the former UHP-implementors. The UHP's funding support had been decreasing over the last two years, and has naturally resulted in diminished logistical support towards the Villarica Project.

However, with the BFD Communal Tree Farming Program in progress also in Villarica, it is likely that necessary inputs to the cooperators may be provided. Some of the Villarica UHP project implementors have in fact joined the BFD-CTF on a staggered basis [i.e., several phases of the CTF Program].

The performance of the Villarica cooperators has finally been recognized by forestry authorities. The SAMABUN recently won

a ₱4,000 award from the BFD for the regional level competition on communal tree farming. The farmers planned to use part of the cash prize for purchasing more coconut seedlings for their farms.

An important thing to note is that the implementors of agro-forestry projects and UHP scientists do find the need for them to establish linkages with various government agencies and institutions to come up with a more holistic approach towards upland development. Sajise (1979), for instance, highlights the need to come up with "institutional control valves" which would eventually achieve a coordinated effort towards upland resource development.

Projects Processes and Impacts

This section discusses project processes and impacts by looking at variations in various impact indicators in the following groups: (a) UHP agro-forestry cooperators in Villarica; (b) Villarica residents grouped according to AFDP cooperators and noncooperators; and (c) Pantabangan residents categorized according to participation in various conservation-oriented projects.

Variation Among the Villarica AFDP Cooperators (drawn from preliminary results of analyses for my doctoral dissertation)

Using data on nineteen Villarica cooperators, regression analysis was performed to examine the factors which partly account for differences in the practice of soil conservation. All nineteen cooperators adopted the cropping patterns recommended by the UHP; and as far as the crops were concerned, they varied in terms of the attempts at various forms of terracing. The relationship tried was:

TERRACING = f (organic matter content in 1979, farm area in 1979, household income in 1979, highest education of household head, knowledge of conservation by household head, potential household labor)

Scores were attached to forms of terracing, where "5" was assigned to bench terracing, and "1" to no form of terracing. For those who practiced combinations (e.g., bench and vegetative), respective scores were added up. Knowledge was measured through

a similar scoring system, based on farmer's responses to questions on the environment. Potential household labor was derived by assigning a value of one-half to minors.

Table 17 shows the results obtained through ordinary least squares estimates, from which the following relationships may be derived (ceteris paribus), with (a) and (e) showing as statistically significant:

(a) initial higher organic matter implies a lower rate of adoption;
(b) larger farm areas imply a lower adoption rate;
(c) the higher the initial income of the farmer, the less likely that he would adopt a cropping pattern;
(d) more knowledge about conservation results in better chances of adoption; and
(e) the larger the pool of household labor, the more likely that the farmer would practice terracing.

Farmers therefore appear to be quite responsive to changes in the environment, and they seem to have benefited from knowledge gained through project implementors. However, those with smaller farms and lower incomes tended to adopt soil conservation practices more easily. The effect of income may be explained further by the fact that those with higher incomes tended to be those with other income sources besides the farm. Naturally, their time was allocated more towards activities with perceived higher and quicker returns The effect of labor available may also explain this as well; however, the variable used may also be interpreted to reflect family size and, hence, consumption needs.

Differences Between AFDP Cooperators and Non-Cooperators in Villarica

To look into differences between Villarica AFDP cooperators and noncooperators, i.e., to test whether the agro-forestry project has made a difference or not, the investigator conducted a survey in 1980. Open-ended questions to test respondents knowledge, attitudes and practice towards conservation were asked. To facilitate the interpretation of respondents' answers, a scoring system was devised mainly for classificatory purposes. Differences in cut-off scores in the three tables merely reflect attempts to meet the requirements for the conduct of x^2-tests.

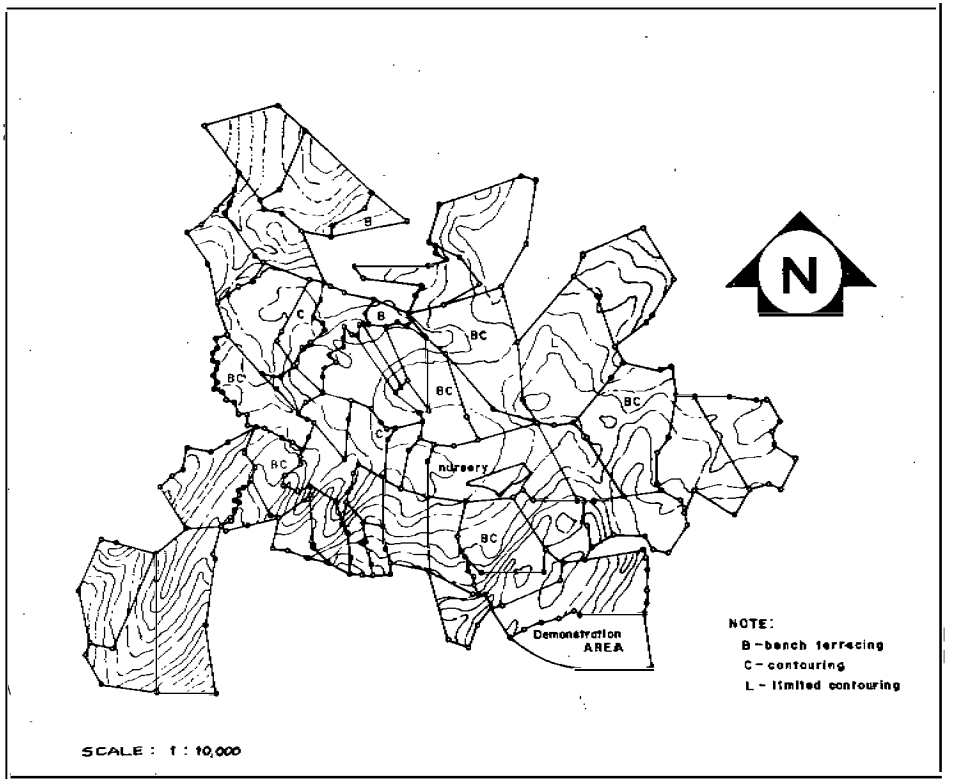

FIGURE 5
LOCATION OF FARMS WITH TERRACING

TABLE 17
REGRESSION ON ADOPTION OF FORMS OF TERRACING BY NINETEEN VILLARICA COOPERATORS

Independent variables	Coefficient (*t*-values) Selection				Mean (standard deviation)
	1	2	3	4	
Constant	4.9652	7.5598	4.4307	7.0967	–
Organic matter content	−3.1115 (−3.7594)*	−3.8440 (−4.8855)*	−3.0231 (−3.5926)*	−3.8113 (−4.7418)*	2.485 (0.691)
Individual farm area	0.0582 (−0.1548)	−0.1535 (−0.4021)	–	–	3.025 (1.678)
Household farm area	–	–	0.45948 (0.12842)	−0.0345 (−0.0933)	3.203 (1.751)
Household income	−0.01495 (−0.524)	−0.02831 (−0.9064)	−0.01791 (−0.6412)	−0.0334 (−1.0988)	23.251 (19.0)
Household head' education	0.3057 (1.5991)	–	0.3251 (1.7342)	–	6.053 (3.1)
Knowledge of conservation	–	0.0593 (1.1099)	–	0.0647 (1.2174)	32.368 (10.589)
Household labor	1.0357 (3.8688)*	0.99297 (3.5646)*	1.0257 (3.7526)*	0.9878 (3.4392)*	5.71 (1.895)
$\bar{R}^2$	0.651	0.6185	0.6508	0.6140	
F	7.71524*	6.83653*	7.70934*	6.7269*	

*Significant at 0.05 level.

Source of Data: ESIA/WID Survey, 1980 and UPLB/UHP.

Tables 18 to 24 present the distribution of the scores of the important variables for the Villarica residents, stratified according to participation in agro-forestation. All x^2-tests indicate that such respondents' stratification does not make a difference in the distribution of all the following scores: (a) knowledge of conservation; (b) practice of conservation; and (c) attitudes towards conservation.

Two possible explanations may be offered for this: (a) The AFDP project has not yet impacted on the important variables. Thus, no difference exists between cooperators and noncooperators. Or, (b) the AFDP has already influenced even the nonparticipants of the community. The second picture is more likely because technological skills could have easily spread during SAMABUN trainings which were not of the closed-door type, and many noncooperators might have already wanted to participate in the SAMABUN. In addition, tree planting inputs were easily available from the BFD which was also implementing its own communal tree farming program in Villarica.

In fact, the focus on one sample activity of an AFDP — that of tree planting as shown in Table 21 — shows no difference among the Villarica AFDP cooperators and noncooperators. In general, one can therefore say that at least 70 percent of the Villarica residents have been planting trees.

Residents were also asked about the benefits they obtained from AFDPs; the replies are presented in Table 22. Significantly, organization with government agencies registered the highest frequencies.

Impact of Various Conservation-Oriented Projects on Pantabangan Residents

The one hundred thirty-three (133) respondents who were surveyed under the ESIA/WID study were categorized according to the manner in which they were influenced by conservation-oriented projects, namely: (1) those who conducted forest conservation through direct participation in AFDP projects, particularly those conducted by UHP and the BFD-CTF (or, UHP/BFD farmer cooperators); (2) those who conducted forest conservation as a manifestation of the ARGSOD human resource development activities (or ARGSOD-influenced farmers); (3) those who were directly employed by NIA or BFD in reforestation projects (or NIA/BFD laborers); and (4) those who were not overtly influenced by any of the three

TABLE 18
KNOWLEDGE SCORES OF VILLARICA RESIDENTS

Scores	Villarica residents				Total
	UHP/AFDP Cooperators		Non-UHP/AFDP Cooperators		
110 and above	11	(65%)	11	(50%)	22
Below – 110	6	(35%)	11	(50%)	17
Total	17	(100%)	22	(100%)	39
	$x^2 = 0.90 < 2.71 \quad (x^2_1, .10)$				

Conclusion: Respondents' classification according to the type of Villarica residents does not make a difference in knowledge score distribution.

Source: ESIA/WID Survey, 1980.

TABLE 19
DISTRIBUTION OF PRACTICE SCORES ACCORDING TO TYPE OF VILLARICA RESIDENTS

Practice scores[a]	Villarica residents				Total
	UHP/AFDP Cooperators		Non-UHP/AFDP Cooperators		
Above 75	10	(59%)	13	(59%)	23
75 and below	7	(41%)	9	(41%)	16
Total	17	(100%)	22	(100%)	39

Conclusion: Respondents' classification by barangay does not make a difference in practice of conservation-oriented activities.

a. The practices of treeplanting, composting, intercropping, and terracing are included here.

Source: ESIA/WID Survey, 1980.

TABLE 20
CONSERVATION ATTITUDE SCORES OF VILLARICA RESIDENTS

Scores	Villarica residents				Total
	UHP/AFDP Cooperators		Non-UHP/AFDP Cooperators		
40 and above	8	(47%)	9	(41%)	17
Below 40	9	(53%)	13	(59%)	22
Total	17	(100%)	22	(100%)	39

$x^2 = .16 \quad < 2.71 \quad (x_1^2, .10)$

Conclusion: Villarica residents' classification according to agro-forestry influence does not make a difference in attitude score distribution.

Source: ESIA/WID Survey, 1980.

TABLE 21
EXTENT OF TREE PLANTING BY VILLARICA RESIDENTS

	UHP/AFDP Cooperators		UHP/AFDP Non-Cooperators		Total	
Finished tree planting activities	12	(70%)	16	(72%)	28	(72%)
Have begun tree planting and will continue in the future	3	(18%)	3	(14%)	6	(15%)
No reply	2	(12%)	3	(14%)	5	(13%)
Total	17	(100%)	22	(100%)	39	(100%)

Source: ESIA/WID Survey, 1980.

TABLE 22
PERCEIVED BENEFITS FROM PARTICIPATION IN AFDP ACTIVITIES BY VILLARICA RESIDENTS

Benefits mentioned (multiple responses possible)	UHP/AFDP Cooperators		UHP/AFDP Non-Cooperators		Total	
Appropriate planting scheme	8	(47%)	14	(64%)	22	(56%)
Cooperation with others	4	(24%)	7	(32%)	11	(28%)
Cooperation with development projects	5	(29%)	5	(23%)	10	(26%)
Cooperation with government agencies	16	(94%)	17	(77%)	33	(85%)
Organization at work	16	(94%)	17	(77%)	33	(85%)
Planning/decision making	16	(94%)	17	(77%)	33	(85%)
Improve in livelihood	10	(59%)	15	(73%)	25	964%)
Peace and order	9	(53%)	14	(64%)	23	(59%)
Total	17	(100%)	22	(100%)	39	(100%)

N.B. Multiple responses allowed. Source: ESIA/WID Survey, 1980.

(termed "none" here). It must be noted here that the fourth "none" group may still be influenced by nonforest conservation-oriented development projects.

Tables 23-25 present the distribution of knowledge, practice and attitude scores generated by the ESIA/WID study. Table 23 indicates that, in terms of knowledge scores, agency influence does not make a difference. Certainly, knowledge on the whys and hows of conservation is gained whether it is taught by natural scientists, social scientists, or through employment in agencies conducting reforestation work. Such knowledge is also easily transmitted to other members of the community.

Table 24, however, shows that agency influence makes a difference in the actual practice of conservation on the farms of the respondents. There is a higher proportion of UHP/BFD farmers practicing agro-forestry activities compared to other residents.

TABLE 23
SCORES ON KNOWLEDGE OF CONSERVATION AMONG PANTABANGAN RESIDENTS

Scores	UHP/BFD Farmer cooperator		ARGSOD Influenced farmers		NIA/BFD Laborers		None		Total	
−110 and above	13	(65%)	28	(52%)	8	(40%)	19	(49%)	68	(51%)
Below − 110	7	(35%)	26	(48%)	12	(60%)	20	(51%)	65	(49%)
Total	20	(100%)	54	(100%)	20	(100%)	39	(100%)	133	(100%)

$x^2 = 2.76 \quad < 6.25 \quad (x^2_3, .10)$

Conclusion: Respodents' classification according to agency influence does not make a difference in knowledge score distribution.

Source: ESIA/WID Survey, 1980.

TABLE 24
SCORES ON PRACTICE OF CONSERVATION AMONG PANTABANGAN RESIDENTS

Scores	UHP/BFD Farmer cooperator		ARGSOD Influenced farmers		NIA/BFD Laborers		None		Total	
Above 50	18	(90%)	31	(57%)	11	(55%)	23	(59%)	83	(62%)
Less than 50	2	(10%)	23	(43%)	9	(45%)	16	(41%)	50	(38%)
Total	20	(100%)	54	(100%)	20	(100%)	39	(100%)	133	(100%)

$x^2 = 7.55 > 6.25 \quad (x_3^2, .10)$

Conclusion: There are differences in the influence of agencies on conservation-oriented activities.

Source: ESIA/WID Survey, 1980.

TABLE 25
SCORES ON CONSERVATION ATTITUDE AMONG PANTABANGAN RESIDENTS

Scores	UHP/BFD Farmer cooperator		ARGSOD Influenced farmers		NIA/BFD Laborers		None		Total	
1 – 60	8	(40%)	10	(18%)	2	(10%)	8	(20%)	28	(21%)
0 to –160	9	(45%)	36	(67%)	14	(70%)	24	(62%)	83	(62%)
below –160	3	(15%)	8	(15%)	4	(20%)	7	(18%)	22	(17%)
Total	20	(100%)	54	(100%)	20	(100%)	39	(100%)	133	(100%)

$x^2 = 14.42 > 12.59 \quad (x^2_6, .05)$

Conclusion: Classification of respondents according to agency influence makes a difference in scores' distribution

Source: ESIA/WID Survey, 1980.

In addition, attitudes towards organization, conservation and development projects also vary across the various agency-influenced groups. Certainly, a favorable attitude towards conservation is a necessary condition for its practice. As Table 25 shows, direct agro-forestry project participants are thus more predisposed to conservation.

Table 26 presents the development projects considered successful by the town residents. Agro-forestry is viewed, on the average, as a successful project, followed by piggery, poultry and goat-raising. Other development projects conducted earlier in the town, such as sewing and rabbit-raising, were considered as failures by the Pantabangeños. It is noteworthy that animal-raising, though not yet actually implemented here, is an AFDP component in other pilot AFDPs such as in Antique. Equally worth noting is that even those not overtly influenced by agro-forestry consider the project as successful.

Pantabangan is one town where local organizations are now tapped by agents of change for active participation in development projects. This perhaps reflects the lessons learned about the failure of packaged plans in the area (see Estacio and St. Peters for a brief discussion of this). And yet, cooperation with government agencies is still a most often-cited problem of organizations, followed by leadership problems (Table 27). However, in terms of the contribution of the Samahan in solving the peace and order problems, Table 28 implies that 50 percent thinks the organization is instrumental in preserving peace and order. A large percentage, 40 percent, however, did not answer the question

A number of issues still confronting the farmers of Pantabangan affect the progress and impact of any land-based development project. The first pertains to land tenure security, an old problem which has yet to be solved. Table 29 which presents land-related issues shows that despite the absence of land tenure security, various approximations to property rights are exercised by the residents. This is indicated by the eleven (11) various forms of "owning" land in Pantabangan.

A high percentage of respondents (40 percent) attributes their land problem to the lack of attention by the government, as shown in Part B of the table. Proposed solutions to the problem and means of working towards the solution vary. Aside from "self-endeavor" and the "no reply" categories, looking towards MAR and the BFD

TABLE 26
DEVELOPMENT PROJECTS CONSIDERED AS SUCCESSFUL BY GROUP-INFLUENCED RESPONDENTS

Development Project[a]	UHP/BFD Farmer cooperator		ARGSOD Influenced farmers		NIA/BFD Laborers		None		Total	
Agro-forestry	13	(65%)	18	(33%)	9	(45%)	38	(97%)	78	(59%)
Goat raising	–		1	(2%)	–		–		1	(1%)
Piggery	–		4	(7%)	2	(10%)	5	(13%)	11	(8%)
Poultry raising	–		3	(6%)	–		5	(8%)	6	(5%)
Total number of respondents	20		54		20		39		133	

a. Multiple responses allowed.

Source: ESIA/WID Survey, 1980.

TABLE 27
NATURE OF PROBLEMS ENCOUNTERED IN ORGANIZATIONAL EFFORTS

Problems[a]	Frequency	(%)
As a member	21	(16)
With other members	38	(29)
Leadership	42	(32)
Samahan rules	25	(19)
Samahan activities	21	(16)
Cooperation with government agencies	61	(46)
Organizational decision-making	28	(21)
Total	133	

a. Multiple responses possible.

Source: ESIA/WID Survey, 1980.

TABLE 28
PANTABANGAN RESIDENTS' OPINION ON WHETHER THE SAMAHAN CONTRIBUTED TO MAINTAINING PEACE AND ORDER

Opinion	Number	(%)
Yes	67	(50)
No	13	(10)
No Reply	53	(40)
Total	133	(100)

Source: ESIA/WID Survey, 1980.

TABLE 29
LAND-RELATED ISSUES IN PANTABANGAN

Land-Related Issues	Total	(%)
A. Status of land ownership		
1. Awarded	9	(7)
2. With title	4	(3)
3. No title	9	(7)
4. Lent	3	(3)
5. With permit	19	(14)
6. No permit	15	(11)
7. Awarded, no title	8	(6)
8. No title, lent	1	(n.s.)
9. No title, with permit	41	(31)
10. No title, no permit	11	(8)
11. Others	6	(5)
Total	126	(95)
B. Perceived reasons for land ownership status		
1. Because of the dam	3	(2)
2. Squatting only	14	(11)
3. Government-owned	6	(5)
4. Lack of government attention	53	(40)
5. Occupied only recently	10	(8)
Total	86	(66)
C. Proposed solutions to land problem		
1. Ask for title	31	(23)
2. Continue tilling	6	(5)
3. Look for other land	4	(3)
4. Buy neighbor's land	1	(1)
5. Organize & coordinate	12	(9)
6. Wait	11	(8)
7. Mark boundaries	1	(1)
8. No solutions	5	(3)
9. Others	13	(10)
10. No reply	1	(1)
Total	85	(64)

Table 29 (Continued)

Land-Related Issues	Total	(%)
D. How to implement proposed solution*		
1. Self endeavor	23	(17)
2. Through "samahan"	8	(6)
3. Through UHP	8	(6)
4. Through ARGSOD	3	(2)
5. Through BFD	19	(14)
6. Through MAR	23	(17)
7. Through NIA	2	(2)
8. Others	16	(12)
9. No reply	50	(38)

*multiple responses

Source: ESIA/WID Survey, 1980.

made up the second set of the most-cited solution. These agencies are responsible for the granting of security of land in the resettlement area and forest lands, respectively. Coordination with the Bureau of Lands is moreover needed for the granting of titles for the alienable and disposable lands currently used by the Pantabangan farmers who are not from Villarica. Villarica farmers, on the other hand, are farming lands under the jurisdiction of the Bureau of Forest Development.

Another related issue currently being tackled by the Pantabangeños has given rise to questions on the impacts of development projects on the quality of life of uplanders in NIA's "gap" hiring, wherein a worker is hired as a casual for three months. At the same time, irregularities in the pay scheme are also reported along with long delays in the payment of salaries. The minimal impact on income may be expected from such employment "opportunities." Table 30, for instance, shows low wages earned from casual employment in contrast with temporary employment.

A comparison of total annual wages earned from casual labor, ₱663-₱704 (Table 30) with the value of household production for an average Villarica farm household estimated by Floro (1980b)

TABLE 30
DAILY WAGE OF HIRED LABORER BY TYPE OF WORK AND STATUS AS OF JANUARY 1980, PANTABANGAN NUEVA ECIJA

Employer	Status	Daily wage	Average annual Wage[a]
1. BFD	Casual	₱13.00	₱ 663.00
2. NIA	Casual	13.54	704.08
	Temporary, semiskilled	17.63	5500.56
	Temporary, skilled	20.57 and above	6417.84

a. For casual who are hired at the average of 1.7 months, the annual wage is computed for 52 days. For temporary laborers, the annual wage is computed for 312 days.

Source: Floro (1980a), Table 14; based on data obtained from NIA Records Division, BFD Office, Pantabangan, Nueva Ecija.

at ₱4,006 shows inferior earning power from casual employment. Of course, temporary employment yields a higher annual income of ₱5,500-₱6,418; when compared with Floro's estimates of minimum income requirement for an average farm household's production and consumption needs of ₱5,009.00, a substantial amount is left for other household needs. Floro's estimates, however, refer to the income (cash and imputed) of farms which have not yet experienced gains from agro-forestation.

To look into how the Villarica project fares in the whole resettlement area in general, a content analysis of the town's newsletter, *Balitang Pantabangan,* was made. Table 31 presents the newsletter's references to agro-forestry-relevant events. As a background information, none of the staffers of the newsletter are residents of Villarica; all the staffers have undergone ARGSOD leadership training. Although the August 1980 issue mentions prospective coordination among the different implementors of agro-forestry related activities, such as the NIA-World Bank Project, ARGSOD and the Villarica SAMABUN, this does not seem to be likely given the recent turn of events, unless all bodies concerned give in to each other's

TABLE 31
EVENTS RELEVANT TO AGRO-FORESTATION REFERRED TO IN THE PANTABANGAN NEWSLETTER

Date and issue of Balitang Pantabangan	News item
April 16 – May, 1980 Balitang Pantabangan (BP) #9 (p. 6)	– BFD Aya Plantation fire. The fire was claimed to have spread from the fire at the NIA plantation.
August 1-31, 1980; BP #13, (p. 3)	– Coordination of ARGSOD, Malbang, East Poblacion and West Poblacion with NIA-Watershed Management and Erosion Control Project on planting trees and vegetables (NIA-WMECP).
	– Coordination with others, such as the NIA-WMECP aid to Villarica SAMABUN; the latter's constitution and by-laws and location map were referred to as bases for help.
September 6 – October 6, 1980 BP #14 (p. 3)	– Reference to the World Vision Green Revolution and Home Beautification Project as having started already.
January – February 1981, (p. 3)	– Mentions wariness of Pantabangan folks on the NEECO project which seeks to contract the farmers for establishing ipil-ipil plantations for a dendrothermal plant. The following reasons were cited: the phosphorous-leeching effect of pure ipil-ipil stands on the soil; decreased land available for the farmer's crops.

demands. For instance, resentment over NIA's gap-hiring would preclude any trust which the farmers might have in the benefits they could expect once the WB Project is fully implemented. The failure of the UHP and the ARGSOD to integrate has also posed problems of coordination between both groups, and between the

two and other agencies. In fact, different priorities attached by development projects to development areas of concern already result in inconsistencies among project implementors. For instance, wariness over the NEECO project (mentioned in the January-February 1981 Pantabangan newsletter) due to environmental reasons is mentioned. Such importance attached to the AFDP project goals is partly reflected in Table 32 which shows the non-reliance on inorganic fertilizer by Villarica farmers, who are the most influenced by the AFDP. In such a case, AFDPs have vast potential impacts on foreign exchange earnings. Specifically, they reduce the dependence on oil-based fertilizer which has a high import content.

Another issue implicit in the differences in priorities attached by various project implementors is the emphasis on the agricultural component vis-à-vis the forestry component, or in more general terms, the short-run needs versus the long-run needs. The ARGSOD claims that focusing on human resource development which includes improvement of farm management skills has produced early impacts on farmers' income. According to the ARGSOD, higher farm in-

TABLE 32
INORGANIC FERTILIZER USE BY PANTABANGAN FARMERS

Barangay	Type of fertilizer
Villarica	None
Malbang	Sulphate 12-12-12
East Poblacion	16-20 Sulphate Animal Manure
West Poblacion	14-14-14 Sulphate 16-20 Animal Manure

Source: Nueva Ecija PDS, 1980.

comes have already been experienced by its farmer-trainees. Indeed, there is room for improving the UHP and BFD agro-forestation schemes, particularly with respect to the agricultural component. Improvements in marketing and development of other farm-based activities could be facilitated by the presence of a closely knit organization.

Impact on Income

The impact on income may be analyzed by looking into the demonstration farm wherein much of the AFDP inputs have been poured. The farm, which is managed by the barrio captain, registered cash farm incomes of ₱2,114 in 1981 and ₱5,713 in 1982 (Table 33). These imply significant increases over the 1978 income of ₱2,000 (UHP Sociology Survey, 1979) and ₱1,040 in 1980 (ESIA/WID Survey, 1980).[1] It should be noted that a typhoon wiped out the harvestable agricultural crops of Pantabangan farmers in 1980.

TABLE 33
CASH INCOME FROM THE DEMONSTRATION FARM
(In Pesos)

Month	Income in current terms[a]		Real income[b]	
	1981	1982	1981	1982
July	262.95	71.35	85.99	21.66
August	241.25	1,070.50	79.50	318.05
September	197.70	518.00	65.12	148.54
October	477.50	1,288.50	155.79	370.41
November	540.45	1,093.40	174.11	303.87
December	394.00	1,671.50	125.00	465.21
Total	2,113.85	5,713.25	685.51	1,627.64
Percent increase	170%		137%	

a. Source: Saplaco (1984, Tables 5 & 6, pp. 12-13).

b. Income in 1972 pesos. The monthly consumer price index for food in Region III where the farm is located was used as deflator.

1. In 1972 pesos, the cash income figures are as follows: ₱914 in 1978, ₱379 in 1980, ₱685 in 1981 and ₱1,627 in 1982.

Should differences among the surveys conducted in the various years arise, it may be more useful to compare only the figures derived by the same researcher. Thus, Table 33 presents only the 1981-82 figures. Here, even after allowing for inflation, a large increase in real income may still be noted. A closer look into the detailed tables (Saplaco 1984) in fact shows that such increase was accounted for largely by higher sales from ginger, tomatoes and eggplant.

Conclusions

The Villarica AFDP appears to be progressing as measured by the stoppage of burning in the farms, the large extent of tree planting, and the adoption of terracing practices. While the discontinuance of kaingin-making and the planting of tree crops have both been followed by all AFDP cooperators, the progress in terracing/vegetative contouring is still minimal. This may be partly attributable to the amount of labor time available to farmers, which varies depending on whether the farmer relies on the farm as a major income source.

The transfer of technology through the use of a demonstration farm, the holding of farmers' classes, and the provision of farm inputs appear to effectively promote the practice of resource conservation measures. Such measures, coupled with the discontinuance of practices destructive to the environment, would engender positive impacts on the environment. However, a significant impact on income has yet to be seen, because of their longer-run nature, and because terracing or vegetative contouring has not yet been widely adopted. Nevertheless, evidence shows increases in the income of the barangay captain who owns the AFDP demonstration farm where inputs (including agricultural ones) have been poured. The agricultural component and bench terracing or vegetative contouring activities thus both need further support for wider adoption by farmer cooperators. This is imporant inasmuch as short-run income increases could be expected from increased agricultural production. An alternative, or supplementary activity — that of involving farmers as laborers in reforestation work by other development project implementors — does not presently offer sustained increases in income because of its temporary nature.

Since organization-building is a major effort in the agroforestation scheme, it produces positive impacts on participation, including participation by women. The Pantabangan respondents consider organization work, decision-making, the preservation of peace and order, and coordination with government agencies as benefits of working through organizations. Agency participation appears to leave much room for improvement, though, especially in terms of facilitating access to land for the farmers.

With respect to the other areas of concern, the data gathered were used mainly for characterizing the project site, the project coordinators, and the initial or preproject conditions of the area. They were nevertheless discussed in order to present possible information sources for analyzing impacts on other areas of concern for a longer time frame.

IV. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

AFDP Components and Conditions for Success

The following emerged as necessary conditions for an AFDP to achieve its objectives: the provision of inputs to the agriculture and forestry components; organization-building, security of land tenure, complementarity with other upland development projects (implying the need for institutional linkages); and human resource development, technology extension, and production and marketing aspects. Forest destruction by loggers, shifting cultivators, and livestock raisers is a multidimensional problem which therefore requires a total approach (sociocultural, economic, ecological, among others) to development. Thus, the ability of project implementors to design and implement AFDPs which address such dimensions is crucial to the success of the project. A resource conservation project such as agro-forestation thus entails the recognition of the interrelationships between the physical, economic and institutional considerations in project implementation.

While it is noteworthy that a general atmosphere of frankness characterizes the project implementors' attempt to be flexible and to learn from the pilot (experimental) nature of the AFDP, the focus on the peculiar aspects of agricultural and forestry development strategies may yet yield valuable lessons with respect to AFDP schemes and implementation. With this strategy, attention will be

paid simultaneously to both the agriculture and forestry components. The pilot project examined here paid *more* attention to tree crop planting, in terms of provision of inputs. For instance, though in the Villarica project terracing technology was introduced through the demonstration farm its adoption during the first two years of the project was quite limited. Yet, this is one component which could be expected to produce positive impacts on agricultural production and income during the early years of AFDPs. Thus, there is a need to look into the factors which may constrain the adoption of terracing, such as labor time available. An analysis of 19 Villarica UHP-AFDP cooperators points out that those who relied more on and spent more time in the farm were the ones who have bench-terraced or built vegetative contours. Another source of agricultural output, that of raising animals, also needs to be implemented more intensively.

Given the numerous considerations which AFDP project implementors need to take into account and the long-term nature of such a resource conservation-oriented project, it is not surprising, then, to initially expect that intensive management for such projects would be necessary. And yet, the pilot nature of the project suggests short-lived, or at best, sporadic implementation, as project personnel turns over. This is particularly true for "special" projects versus "regular" projects.

However, organization and skill-building may yet prove to be better alternatives to intensive project management by external agents of change. This may be sufficient in the long run if and only if government agencies from whom assistance is sought by local organizations are responsive to the latter's needs. In this respect, the Villarica and Pantabangan experiences indicate that much still needs to be done by agencies operating in the distant, upland areas.

Such factors which affect the sustained and holistic implementation of agro-forestation in the project sites as well as their eventual implementation in other areas occupied by shifting cultivators suggest the need to look into the institutionalization of AFDP concepts and schemes in recent forestry development planning and implementation. The emergence of the MNR's Integrated Social Forestry Development Program and the Bureau of Forest Development's Upland Development Working Groups are positive steps in this direction. In fact, the numerous significant changes in forest policy formulation and implementation concerning the shifting

cultivators has been notable. However, the manner of training forestry extension agents towards AFDPs and of achieving coordination between forestry implementors/developers and other agents of change remains to be tackled.

AFDP Impacts

The studied AFDP produces impacts primarily on the following areas of concern: environment, participation, production and income (potentially), and education.

a. Environment

The impact on the *environment* as measured by the crop diversity, agro-forest crop mix, terracing and contouring, and discontinuance of burning has been directly observed for the AFDP project. However, the external effect of maintaining ecological balance as measured by the various environmental indicators has not yet been validated because of its long-term nature. Discussion of such indicators focused only on their base line values.

In terms of the stoppage of kaingin-making, the AFDPs appear to have achieved direct and positive impacts on the environment. This is particularly true when one focuses on the AFDP's continuing cooperators only. However, given the dropping out of cooperators such as those in the Villarica project, and potential increases in migration into the uplands, continued practice of *kaingin*-making may still be expected to occur. These imply that agro-forestation should not be expected to singlehandedly solve the upland denudation and forest occupancy management problems.

b. Participation

Impact on *participation* is an immediate and direct impact of AFDP because organization-building is a major input of the UHP-Villarica AFDP. Participation here includes the following levels: (a) participation in the political process by the project cooperators via development of local organizations; (b) participation in AFDP activities by women; and (c) participation by various government agencies in the development of local communities through AFDP project implementation.

c. Production/Productivity

Impact on *production* may be seen in terms of the potential outputs of the new cropping systems established in the farms. While it is still too early to measure the impact on forestry production, the high survival rates of the tree seedlings planted under the Villarica AFDP suggest increased production from such trees in the future. With respect to agricultural crop production, higher *income* in the Villarica deomonstration farm suggests increased production; a similar increase is also noted for the ARGSOD farms. However, a more widespread implementation of techniques which would increase agriculture production from crops and animals has yet to be seen in Villarica.

d. Income/Labor-Use

The impact on *income* which is partly produced via increased production and productivity is similarly indicated only for "ideal" project cooperators of UHP and ARGSOD in Villarica and the other Pantabangan towns, respectively.

Compared with income from employment in reforestation projects, potential income increases from AFDPs appear to be more promising and stable for the farmers. This brings to mind possible competition for labor by various development projects in uplands which are designed to be labor-intensive. In fact, this was reported as a problem area more recently by an implementor of the NIA-Pantabangan project (Galvez 1984). Here, a time allocation study for households in uplands is in order.

e. Education

The impact on education is direct, and may be measured in terms of better knowledge of resource conservation by the farmer cooperators, as a result of farmer training, and skills learned from the demonstration farm. Such knowledge appears to have been acquired regardless of the type of forest land conservation project being implemented. Since the AFDP assessed was experimental, and was generally research-oriented, one can also say that the impact on "education" or knowledge of project implementors on AFDP had been produced by the project.

Perhaps, the distinguishing feature of AFDP is that it simultaneously produces an impact on implementors and on policy-makers with whom the implementors interact. Significant changes in the attitudes and policies of forest authorities towards shifting cultivators are worth noting.

f. Energy

The impact on energy by the Villarica AFDP is indicated by the reliance on compost fertilizer which thereby reduces dependence on oil-based inorganic fertilizer. However, since the project is of small scale, such impact may not yet be substantial from the viewpoint of the energy bill. The impact on dendro-energy appears to be minimal since the project avoids the tree-monoculture type of plantations. The effects of hydro-based energy which are expected from better maintenance of reservoir supporting watersheds are not attributable to the AFDP alone.

g. Other Areas of Concern

The impact on health, population, and nutrition, which are produced through income effects and which are also dependent on education, presence of social services, and the like, is more weakly related to AFDPs in the short run. Minimization of malaria cases would be expected only after the uplands have considerably improved, i.e, in the long run. Improved nutrition should be expected if there were significant increases in vegetable crop production and rich protein-sources (e.g., poultry), but, since this has not yet been depicted by the AFDP studied, it cannot be expected as yet.

Impact and Progress Assessment

Evaluation studies of development projects which attempt to develop formerly bypassed areas such as the uplands encounter difficulties with respect to the relevance of traditional sources of information, and the availability of manageable data with which to test hypotheses on project effects. However, local sources of information and data gathered by project implementors themselves can yield valuable insights into project progress and impact. Pro-

cessing of data generated by such sources should, however, be supplemented by observations made during trips to project sites.

Studies on agro-forestation, a time-intensive activity, need to be conducted for a longer duration for the evaluation of long-run impacts. However, monitoring of the project's short-run effects also needs to be done because most AFDPs are still experimental, and could therefore yield useful information to the project implementors. Also, significant impacts of the project may already be deduced after careful observation and analysis of the AFDP's short-run effects.

While the progress and impact studies are being conducted on specific project sites, the general atmosphere within which they are implemented also needs to be monitored; this includes looking into forest land management policies and population control and employment programs. This stems from the fact that forest denudation is a result of numerous events including those beyond the control of forest authorities.

Suggestions for Future Research

Based on questions raised during the discussion, the following issues relevant to agro-forestation should be dealt with as soon as more information is gathered from the several pilot projects:

1. the minimum land area for satisfying the basic needs of the former;
2. competition for family labor between agriculture and forest crops (in terms of participation in pure reforestation, agro-forestation and/or the labor market);
3. cost effectiveness of various forest restoration schemes tried out by different government agencies;
4. absorption of landless workers by upland employment-generating activities;
5. environmental impact of expanding communities in the upland;
6. maximum family size sustainable by various agroforestation schemes;
7. factors affecting the adoption of soil conservation practices, particularly those which may be directly influenced by policy changes; and

8. detailed farm level socioeconomic studies.

Such site and community-specific studies are a prerequisite to the economic evaluation of upland development projects which need to be analyzed from the viewpoint of society and in terms of off-site impacts as well.

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Symbols not defined elsewhere in text:

AUDP – Antique Upland Development Project
BAI – Bureau of Animal Industry
MAR – Ministry of Agrarian Reform
MLGCD – Ministry of Local Government and Community Development
NCSO – National Census and Statistics Office
NEA – National Electrification Administration
PC-INP – Phil. Constabulary-Integrated National Police
PDS – Provincial Development Staff
PHILCOA– Philippine Coconut Authority
UPSEC – University of the Phil. Sccience Education Center
WMECP – Watershed Management and Erosion Central Project